1974 BARSTOW – LAS VEGAS

MOTORCYCLE RACE

EVALUATION REPORT

PREPARED

March 1975

U[illegible]STATES DEPARTMENT OF THE INTERIOR
[illegible]UREAU OF LAND MANAGEMENT

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

STATE OFFICE
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To The Readers Of This Report:

This is a Bureau of Land Management evaluation report on the 1974 Barstow to Las Vegas motorcycle race. It is made from baseline data collected prior to the race; monitoring done during the event; and studies made after the race. The purpose of the report is: (1) evaluate the event in relation to the Proposed Barstow-Las Vegas Motorcycle Race Environmental Impact Statement (E.I.S.) - Department of Interior, Bureau of Land Management - October 1974; (2) investigate compliance with the provisions of Special Land Use Permit 04-060-SL4-133 issued to San Gabriel Motorcycle Club; (3) measure environmental changes caused by the race; and (4) identify where additional study is required to fully evaluate the impact of this race and related activities on the lands and resources in the California Desert.

This report is a summary of data and findings. Further assumptions and conclusions can not be made without additional data. All related study data and basis for findings contained in this report are on file with the Bureau of Land Management.

Acting State Director

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BARSTOW – LAS VEGAS MOTORCYCLE RACE

EVALUATION REPORT FOR THE
1974 BARSTOW TO LAS VEGAS MOTORCYCLE RACE

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I. IMPACT SUMMARY

A. Brief Description of Event

The Barstow-Las Vegas Motorcycle Race was a point to point, speed contest, referred to as a "Hare and Hound" event. The race, advertised as the world's largest motorcycle race, took place on November 30, 1974, Thanksgiving weekend.

The race involved a "mass" start. Riders rated as "experts" or "amateur" by American Motorcycle Association Riding Classifications started first. There were about 1,200 participants in the first wave. Approximately one hour later, a second wave of about 1,800 "novice" or "beginner" riders began in mass. There were approximately 3,000 entrants in all.

The course traversed 155+ miles of desert terrain from a point about 20 miles east of Barstow, California, to a point 9 miles south of Las Vegas, Nevada. In order to deter riders from straying or short-cutting the previously marked course, the sponsoring club (the San Gabriel Valley Motorcycle Club) established unannounced "check points". Upon arriving at each checkpoint, referrees marked a piece of paper previously taped to each rider's gas tank. Upon finishing, each rider turned in the "tank card" to prove each checkpoint had been encountered. Several designated "pit stops", from 30 to 50 miles apart, were established for fuel and spare parts. Most of the course had been used for the preceding seven years. All of the course had been used in at least one previous Barstow to Las Vegas Race.

Approximately 132 of the 155+ miles of the race course was on National Resource Lands administered by the Bureau of Land Management, Department of Interior. A Special Land Use Permit for this event was issued the sponsoring organization. The stipulations contained in this permit were designed to mitigate resource disturbance and were developed from a comprehensive Environmental Impact Statement (E.I.S.).

B. Mitigation Compliance Summary

Pre-race handouts and course marshalling kept all campers within the designated camping areas.

Portable toilet facilities were inadequate at the start and the Valley Wells pit stop.

Pit area design proved to be an important factor in operational control.

Total compliance with mitigation measures along the course was not achieved.

Specific marking techniques were used effectively to control racers on portions of the course.

Consistency in stopping all racers at all paved road crossings was not achieved.

C. Resource Impact Summaries

1. SOILS

Two-thirds of the comparison samples taken after the race indicated compaction occurred. This was predominantly exhibited on the Anthony-Cajon-Arizo (AC) and Rosamond-Playa (RP)

Associations. The AC Association is a sandy, gravelly alluvium found on terraces and sloping fans. The RP Association represents the dry lake beds. These two associations represented the bulk of the race course.

Analysis indicated a significant increase in bulk density on these soils. This results in reduced capillary pore space, infiltration, and percolation rates, leading to more rapid run-off and erosion.

Surface pavements have been destroyed with a subsequent loss of protection from wind erosion. Areas of desert pavements on alluvial fans, plains and terraces received most of the surface disturbance. Immediate impact from one motorcycle across a pavement is moderate but long lasting. This condition is compounded as numbers of motorcycles increase.

Root development will be restricted and will probably cause problems in establishing new seedlings.

The least surface disturbance or change occurred in sandy washes.

2. VEGETATION

There was a heavy impact on the vegetation in parking areas.

Seedlings that had germinated before the surface disturbance were eliminated.

Where the race was confined to existing roads, trails, barren washes and playas, the least impact on plants occurred.

3. WILDLIFE

Within the two study plots located at the start of the race, 90% reduction in the small mammal population occurred. These plots were trapped before and after the race.

4. CULTURAL RESOURCES

Measures devised for the protection of cultural resources along the race in general proved less effective than anticipated. Of 19 sites investigated after the race, three sustained 15% or greater disturbance; four sustained 6 to 15% disturbance; the remainder sustained 5% or less disturbance.

Overall, 4 of the 19 sites have sustained less than 10% total damage from this and apparent previous races.

Heavy impact occurred on two sites eligible for inclusion on the National Register, as portions of a District (Cronese Lake and site BV-5).

Impact on two historic sites eligible for the National Register, the Tonapah-Tidewater Railroad Grade and the Mojave Road (Old Gov't Road), was difficult to assess, however, the cutting of a 2 to 3 foot trench through the berm of the Railroad Grade was significant.

Not all cultural sites were identified in pre-race surveys.

5. OUTDOOR RECREATION

The calculated figure for spectators, crews and riders, was 9,902. This was 3,908 less than EIS estimate. These figures are inconclusive, however. Vehicles in route on freeways were missed and people were not counted fully at the start and finish (the crowd fluctuated).

The EIS assumed many other recreation activities occurred simultaneously in the same area the race was held and that there were possible conflicts with race-associated users. Since no counts or interviews of other recreationists are available (only race-associated recreationists), no evaluation of possible conflicts could be made in this study.

Interview data is not adequate to evaluate personal benefits (psychological, social, etc.) of race-associated users or of other recreationists. These factors, as well as related safety factors, still require detailed study and analysis.

6. AIR QUALITY

The EIS predicted that 24-hour suspended dust concentrations would be equal to 195 ug/m^3 on the Nevada portion of the course and that they would exceed this amount in California (because of a greater number of vehicles). Actual measured 24-hour concentrations were less than those predicted; ranging from 97 ug/m^3 at the Finish area, to 176 ug/m^3 at the Rasor Road pit stop.

The EIS predicted that the California suspended particulate ambient air quality standards would be exceeded. The California (100 ug/m^3) standards were exceeded on the day of the race by between 58% and 76%, and were exceeded on the day following the race at the Rasor Road station. The Nevada and Federal secondary standards are 150 ug/m^3. They were exceeded at the Stateline measuring station (160 ug/m^3), but not at the finish area (97 ug/m^3). The EIS predicted that the secondary Nevada and Federal standards

would be exceeded. Suspended particulate levels at Barstow were not affected by the race.

The EIS indicated that 590 tons of particulates would be generated by the race. Data collected by San Bernardino County, indicates that the EIS underestimated the effect of the race on particulate generation.

Although it is not possible to directly compare the monitoring results with the EIS predictions, the monitoring data indicates that the race increased 30-day particulate levels by 31 percent between the start area and the Rasor Road pit stop. At the close of the 30-day collection period, source sites were undergoing natural repair.

The analysis from which this summary was derived appears in the appendices.

7. SURFACE IMPACT SUMMARY

The total increase in the area of influence from this race over past races is 1,921 acres, or 25%. The area of influence of the race course increased from 5,265 acres to 6,897 acres; a difference of 1,632 acres or 31%. The area of influence of the start, pits, and finish areas increased from 2,240 acres to 2,529 acres; a difference of 289 acres or 13%. The EIS predicted no increase in the area of influence.

A major factor in the increase of the area of influence at the start of the course was participant failure to see the smoke bomb. This failure increased the area of influence at least three miles beyond the smoke bomb location. Bunching up by the second

wave of racers was another major factor in the increase of the area of influence.

The tracked area within the area of influence, as evidenced by before and after E.S.P. plot calculations, increased by at least 673 acres.

II. POST EVENT EVALUATION

A. General Objectives

The objectives of this evaluation are to (1) determine the degree of sponsor compliance with the mitigation measures derived from the environmental impact statement (E.I.S.) and (2) measure the environmental changes caused by the race.

The Special Land Use Permit (SLUP) issued the sponsor for the race enumerated several stipulations developed from the E.I.S. analysis. These stipulations were designed to mitigate the potentially harmful aspects of the race and protect both the resource user and the resource. How well the sponsor complied with these stipulations and how effective the stipulations were in alleviating the impact of the race is discussed in Section III, Mitigation Compliance.

The E.I.S. contained a pre-race description of the environment to be impacted and an analysis of the impacts' anticipated severity. A diverse quantity of technical data was collected. Where technical information was not available, estimates were made as objectively as possible. Section IV, Resource Impact, discusses the effect of the race on six measured environmental components, and whenever possible, compares the findings to the pre-race impact estimates and analysis. An analysis of air quality appears in an appendix.

B. Description of Evaluation

This evaluation, as developed from its objectives, addresses two principal subjects - mitigation compliance and resource impacts.

Compliance with the permit stipulations was determined by the Bureau's field personnel from the Riverside District Office. The race course was divided into sections and Bureau Section Captains were assigned responsibility for monitoring activity within these areas. Points within each section had been identified in the E.I.S. for special mitigation measures and, to the extent possible, personnel were assigned to these points. A primary responsibility of the Bureau was to "monitor" the activities that occurred, attempt to assure compliance, and report on the degree of compliance and effectiveness of the protective measures taken. The Mitigation Compliance Section, III, of the report is a synthesis of the many reports completed by the field personnel.

To determine the impact of the race on the environment, several data gathering methods were used; Environmental Sampling Photo (ESP) plots, aerial photography, soil sampling, pre- and post-race wildlife trapping, participant/spectator surveys, and air quality monitoring.

Twenty-six ESP plots were established along the race course which were representative of the various soil and vegetation associations (See Figure II-1). At each plot a 360-degree series

of photos were taken with a 35mm camera, placed 4.5 feet above the ground on a levelled tripod with a panorama head. (See Figure II-1.) In each of the photos, scale is established by a range pole located 50 feet from the camera. The panoramic photos taken provide a permanent visual record of environmental change. Information derived from the initial "before" and "after" photos is found in this report.

The ESP sites will be rephotographed once in spring and once in fall. Field personnel patrolling in the area of the ESP plots will monitor when plant growth and flower bloom are active. At that time, spring photos will be taken to determine the relative abundance of annual vegetation in and beside the course. In the fall, after the annuals have matured and died, an additional set of photos will be taken to observe any new or recovered perennial vegetation.

In addition to the ESP plot photography, vertical 70mm aerial photos were taken. This photography concentrates on the general ESP plot area and also provides "before" and "after" photo coverage. The color aerial, stereo, overlapped photography was mostly 1:600 scale. Oblique 4 x 5 black and white photos were taken during the race and provided the spectator/participant count information, and information on the area of influence.

Various soil sample readings were taken at each ESP plot prior to the race. Comparison readings were made after the race, with exceptions where a similar soil site existed and sample plot readings had been taken. A soil pit was dug to record soil characteristic

information such as horizon depths, texture, and structure. Instruments were then used to measure shear strength and penetration factors of the soil surface, and each identified soil horizon. A bulk density sample, measuring the volume of soil in a small sample, was collected for each site. If surface gravels were present, a square foot sample was collected. The bulk density soil samples and surface gravel samples were sent to a commercial laboratory for analysis.

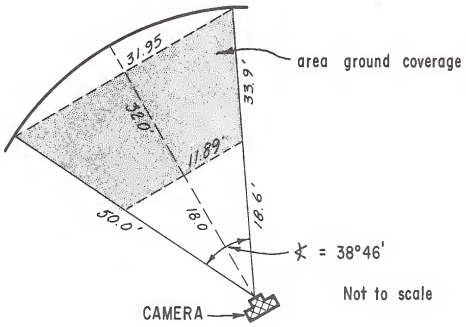
Figure II-1

RACE COURSE AREA AND TRACKING CALCULATIONS

Area of each E.S.P. plot visible within the 50 feet radius plot was determined as follows;

Assume: level ground & precise before and after camera frame alignment (camera height and angle)

Calculated:



$\frac{31.95' + 11.89'}{2}$ = (32') = 701.44 ㎡/ FRAME or 701.44㎡/

FRAME X 10 FRAMES/ESP PLOT = 701.44㎡ or 0.16 ACRE

NOTE: ㎡ REFER TO SQUARE FEET

A wildlife trapping study was developed to measure the changes in small mammal populations before and after the race. A site was chosen near the start on the race course and the numbers of small mammals were measured immediately prior to and after the event. A more detailed description of the procedures used appears in the wildlife portion of Section IV, Resource Impact.

Recreation use surveys were conducted to obtain socio-economic information regarding the race spectator, crew, and participant. Also, an attempt was made to conduct a survey to determine the impact of the race on the desert recreationist not concerned with the race, particularly in regard to possible conflicts with race related recreationists. Single-page questionnaires were completed by interviewing randomly-selected individuals at different points along the race course, and in parts of the area other than that immediately influenced by the race. The data to determine the impact of the race on the desert recreationists not associated with the race is inadequate, therefore no analysis of conflicts is made in this report.

Bureau personnel developed and implemented the methodology, analyzed the information collected, and compiled this report. The air quality information was collected and analyzed by personnel from San Bernardino County, California, and BLM staff personnel. This data appears in summary form in the appendix.

The one major resource value discussed in the E.I.S. and not addressed in this report is Aesthetics.

An analysis of the Environmental Study Plots indicates there was greater surface disturbance than anticipated in the E.I.S. In order to determine how this increased surface disturbance has affected the scenic quality of the area, the Bureau will conduct a post-race examination of the course involving the same aesthetic study segments and criteria that were developed for the E.I.S.

C. Definition of Course Impact Area

In the following discussions regarding the impact of the race, two different descriptive terms are used to identify separate aspects of the race course area affected. These terms are "area of influence" and "tracked area".

The area of influence is a general term used to describe the surface area disturbed in average acres. It is calculated by multiplying the average course width by course segment lengths. In the E.I.S., the area of influence was delineated on maps by observations, both aerial and ground. For this evaluation, the area of influence was derived from data obtained at each ESP site, the 70mm aerial photography, and 4x5 oblique aerial photos.

The tracked area is that surface area actually covered by the tire tracks within the area of influence. Before and after analysis of the ESP sites revealed the tracked area increased by 673 acres.

III. MITIGATION COMPLIANCE

A. Objective

One of the objectives in the post race evaluation was to determine compliance with the general and specific conditions of the Special Land Use Permit. A copy of this permit is included in the appendix. Through the race monitoring program instances of non-compliance were documented. This portion of the post race evaluation addresses the recorded instances of non-compliance of the specific conditions, and identifies the degree of resource impact.

B. Coordination Measures

The sponsoring organization, the San Gabriel Valley Motorcycle Club, through experience had developed an effective organizational structure for managing the Barstow to Las Vegas Race. A Club Referee has overall responsibility and six Club Section Captains had on-the-ground supervision responsibilities for a specific portion of the course. To facilitate communication and coordination, the Bureau utilized the same organizational structure with the Chief Ranger having overall responsibility and six Section Captains having on-the-ground responsibility for certain sections of the course. This provided for key individuals from both organizations to function on a one-on-one basis in the field during all phases of the event from the course marking through race day and subsequent cleanup. Prior to contact with the sponsoring organization, Bureau Section Captains spent time in the field with BLM Resource Specialists to assure

everyone was completely familiar with the specific mitigation requirements. Bureau Section Captains then worked with their counterparts from the sponsoring club in determining how the mitigation measures were to be accomplished.

C. Site Specific Mitigation Measures and Findings

In addition to the general stipulations which apply to all competitive events, the Special Land Use Permit for the Barstow/Las Vegas Race contained 36 site specific stipulations which were the special mitigation measures identified in the E.I.S. A discussion of each special stipulation and the results are as follows:

SITE SPECIFIC MITIGATION 1: (START) "To avoid injury to riders and spectators, the start area will be clearly marked with lime and flagging; no less than six course marshals will be required to line up racers and to keep spectators off the course."

The starting line was placed about 10 feet east of the Alvord Dirt Road, with the southern end being ½ mile north of the 100 KV powerline. A fence 50 feet long was set up running east and west from the southern end of the starting line, with an additional 100 yards of lath and flagging. The bulk of the spectators were located here. The starting line for the first wave measured 1.2 miles long with the bulk of the riders (shoulder to shoulder) located in the first .6 of a mile. There was a great deal of congestion of bikes and vehicles at the start,

but nothing that appeared to interfere with the racers. The fence and banners at the southern end of the start line, along with club marshals, adequately controlled spectator encroachment.

The smoke bomb, which was placed about 3 miles out to direct the racers from a mass start to the beginning of the marked course, was not visible because the smoke was not dense enough when the first wave of about 1,200 riders started the race at 8:00 a.m.* The dust cloud created by this mass cleared within an 8 to 10 minute period. The density of the smoke from the bomb increased and was visible at the start of the second wave at 8:57 a.m. However, because of the dust and the smoke both being white, it remained visible only to the few leaders of this wave. The number of injuries occurring in the start area is not known. However, the commander of "Rescue 3" (the organization providing first aid coverage for the event) felt that the two areas with the most injuries were the start area and Basin Road Area. Appendix 3 provides a summary of injuries occurring at the event. No known injuries to racers, spectators, or crew occurred due to encroachment onto the race course by non-competitors.

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* In the past, a large column of smoke has been used to guide racers from the mass start onto the marked race course. The smoke was produced by burning a pile of 50 to 100 used automobile tires. For the 1974 race, the San Bernardino County Air Pollution Control District would not grant a permit for this procedure. Consequently, 6 cannisters of white signaling smoke were ignited for each wave of racers.

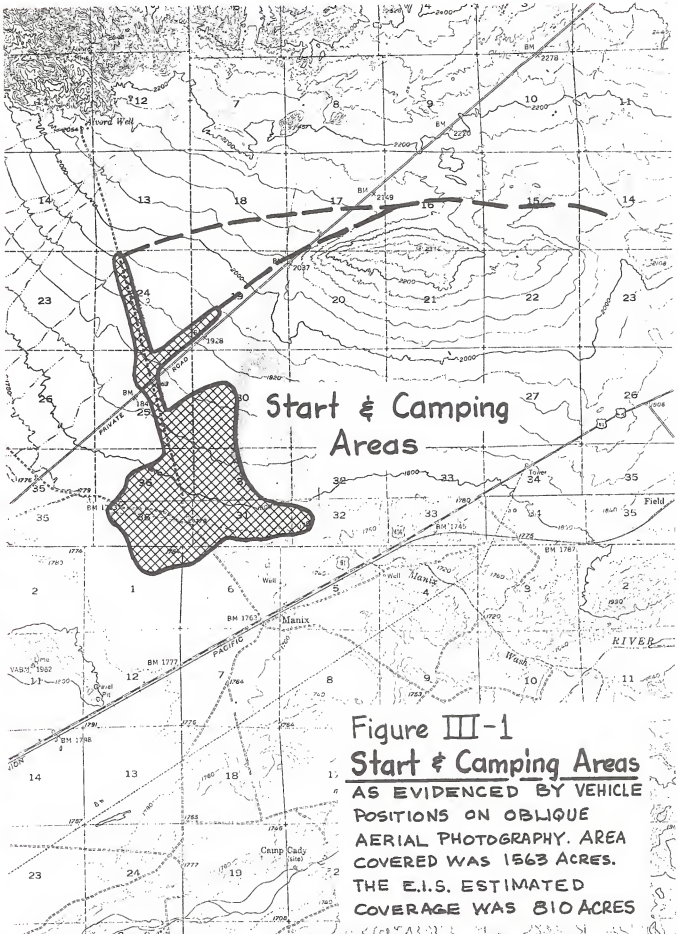


Figure III-1
Start & Camping Areas
AS EVIDENCED BY VEHICLE POSITIONS ON OBLIQUE AERIAL PHOTOGRAPHY. AREA COVERED WAS 1563 ACRES. THE E.I.S. ESTIMATED COVERAGE WAS 810 ACRES

SITE SPECIFIC MITIGATION 2: "Camping areas will be marked to avoid extensive impact to resources. At least four course marshals will be necessary."

All no-camping and authorized camping areas were well marked and patrolled. A map handout containing camping information and rider instructions was given to each vehicle entering the start area on Thursday, November 28, through race day.

The extensive signing of both the no-camping and authorized camping areas, the marshalling by club members, plus the map and camping information, combined to produce 99% compliance in the camping area.

SITE SPECIFIC MITIGATION 3: "To avoid impact to the resources, the three dirt roads on the ridge will be blocked and posted "CLOSED". At least one course marshal will be provided to keep joyriders off the ridge." (This ridge was the only prominent hill from which the start of the race, located some two miles away, could be viewed.)

Two of the three roads were barricaded prior to race day. Enough NO TRESPASSING signs were placed to make unknowing encroachment unlikely. A club course marshal was present on Friday afternoon, November 29, and for about 1 hour on race day. Two BLM rangers patrolled the area on motorcycles on Friday afternoon and all race day. Friday, eight vehicles were intercepted on their way up the hill and asked to turn back.

Saturday (race day), 13 vehicles were noted on top of the hill and asked to leave, while 32 others were intercepted and kept from going up the hill. Because of lack of communication (equipment such as a voice horn would have been useful), the rangers themselves created some encroachment on the resources here by going to the top of the hill to intercept others. According to a Bureau Resource Specialist, an increase of less than 5% resource disturbance occurred.

SITE SPECIFIC MITIGATION 4: "To avoid the hazard of the transmission line towers and to keep spectators off the course, special marking techniques will be worked out with the permittee. At least two course marshals will be needed."

Barricading the telephone maintenance road and the powerline road, plus the action of the course marshals, kept the spectators away from the hazard of the race course crossing under the transmission lines. The towers themselves were not ribboned. No known injuries occurred in this area.

It was noted that the military vehicles (National Guard), present to sweep the course for injured riders, followed the racers right down the course. At two points, one near the start and the other on Soda Dry Lake, one of the military vehicles became stuck and had to be pulled out. In this process, a trenched and churned up area was created. These vehicles did not proceed beyond Soda Lake.

SITE SPECIFIC MITIGATION 5: (SPANISH CANYON) "To avoid impact to resources, the canyon areas to the north of the start will be closed to vehicular traffic during the duration of the event."

Alvord Road leading to the Spanish Canyon Area was barricaded at a point about ¼ mile north of the northern edge of the starting line. No encroachment into the Spanish Canyon Area was noted during the event.

SITE SPECIFIC MITIGATION 6: "To avoid impact to resources, the course segment will be routed ¼ mile north on an existing graded road as designated by BLM personnel in the field."

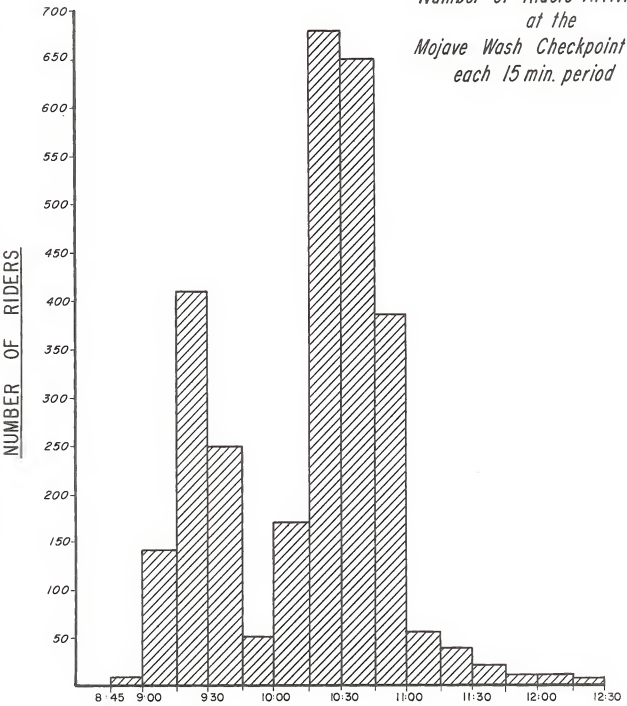
In addition to heavy marking with ribbon, lime, and course markers, 6 course marshals were used as flagmen to keep racers on course. The course was a graded road through this section.

During the first wave, 99% compliance resulted with no rider observed going through the nearby significant natural resource area (Crucifixion Thorn Area). The first 1/3 of the second wave maintained the same level of compliance. However, during the middle half of the second wave, "bunching-up" began to occur at the head of a small pass through which the course was routed. This pass was about ¼ mile west of the graded road and the club flagmen. Probably as a result of this "bunching-up" and the heavy dust, about 500-600 riders went up over the hill to the south of the course, then down onto the road south of the club flagmen. Upon reaching the road, this group of riders turned north

TABLE III-1

MOJAVE WASH

Number of Riders Arriving at the Mojave Wash Checkpoint in each 15 min. period



along the road causing bunching-up to again occur near the flagmen. This bunching-up and the heavy dust caused about 250 riders to leave the course and go through the nearby significant natural resource area.

Data from the E.S.P. plot in the area indicated that the number and area of tracks increased 212% but no vegetation within the plot was damaged. This non-compliance was another major factor in the unpredicted increase in the area of influence.

The distribution of riders through the Mojave Wash check point indicates bunching-up as noted above continued through sites #7, 8, 9, 10, and 11. (See Table III-1.)

SITE SPECIFIC MITIGATION 7: "To moderate impact to resources, the course must be channelled to narrow the route to 20 feet through approximately a 1,000-foot area as identified in the field by BLM."

Special flagging, consisting of ribbon strung between lath starting 1,000-1,500 feet before the mitigation site, gradually narrowed the course from 500 feet to 20 feet. Also 25-30 signs reading "STAY ON COURSE" were posted.

During the first wave, over 90% compliance was achieved with all but 90 of the racers staying on the 20-foot wide course. The second wave brought approximately 75% compliance with 298 racers being off course. The Bureau monitor at this location reported that during the last half of the second wave particularly, the dust was very bad.

Maximum visibility was only 75 feet. A Bureau specialist estimated that 1 to 2% of a cultural site in the area received new disturbance.

SITE SPECIFIC MITIGATION 8: "To moderate impact to resources, the course must be channelled to narrow the route to a 20-foot wide course through approximately a 500-foot long area as identified in the field by BLM."

This area was just east of Site #7. A small hill separated the two resource sites. Those racers on course through Site #7 remained on course through this area. Those outside the 20-foot course in Site #7 remained outside the 20-foot course through Site 8. Total compliance through Sites #7 and #8 is estimated to be 80-85%. A Bureau specialist estimated that the cultural resources in this area received about 10% increase in disturbance.

SITE SPECIFIC MITIGATION 9: "To avoid impact to resources, the course route must be channelled to a 20-foot width through approximately a 500-foot long area as identified in the field by BLM."

The same methods were utilized here as at Sites #7 and #8, with the same degree of success. A Bureau specialist estimated that a cultural resource site in the area received about a 10% increase in disturbance brought about by widening of existing trails.

SITE SPECIFIC MITIGATION 10: "To avoid impact to resources, the course route must be marked to limit the course to a 100-foot width."

Through this 8-mile section of the course, the area of influence of old existing courses spreads out over about a one-mile width. To comply with the mitigation, the section captains tried to "second guess" the riders by routing the course where they would naturally choose to go, as long as existing courses were used. For about one mile, a wash with natural barriers on one side was marked as the course.

No monitor was present here, but post race analysis indicates that 80% of the racers stayed within a 100-foot width. The other 20% approached a ½-mile spread. Most of this 20% non-compliance was on three new main trails about 8 to 10 feet in width. Upon entering West Cronese Dry Lake, the racers spread out fairly evenly over a one-half mile width.

A Bureau specialist estimated that 10 to 15% of a specific cultural resource area was disturbed. A contributing factor here, along with the dust, was that the original extent of the cultural resource in this area was inadequately determined during the pre-race assessment.

SITE SPECIFIC MITIGATION 11: (CAT MOUNTAIN) "To avoid impact to resources, the course will be flagged and marked to channel riders to and over the north saddle. At least two course marshals will be required."

Section captains chose to establish a check point at the top of the north saddle of Cat Mountain. This check point was visible to the riders as they approached the east side of West Cronese Lake.

Compliance at the checkpoint was 99%. A Bureau specialist estimated that little disturbance occurred to the cultural resources in this area. About a quarter of a mile past this check point, the course entered East Cronese Dry Lake. Most of the racers concentrated on a 15-foot wide course. However, data collected from an E.S.P. plot here indicated that about 20 racers extended the area of influence to about 180 feet. Data from the E.S.P. plot also indicated that the number and area of tracks increased 72% and that 27% of the plants within the plot were damaged.

Some deep, hazardous trenches existed on East Cronese Dry Lake. Those trenches near the course were well flagged and marked with the standard danger symbols. The 20 or so riders who had scattered out prior to entering the dry lake bed continued to scatter out further, which took them into this danger area. A serious injury occurred when one of these racers dropped into one of the trenches. Some of the trenches were up to 4 feet deep, 10 feet wide, and 50 feet long.

SITE MITIGATION 13: (RASOR ROAD PIT STOP) "The course in and out of the pit stop will be closely marked and flagged; pit crew and spectator areas will be identified and marked. At least four course marshals will be provided to keep spectators off the course."

The course was closely marked and flagged and the west end of the pitting area tightly controlled as to "pit crew only" locations. Lime was used to mark spectator and pit crew traffic lanes in and out of the pitting area. Monitors were to keep the spectators and pit

crews north of the course itself. The club was also to provide a nearby business with a course marshal to assist in traffic control and parking.

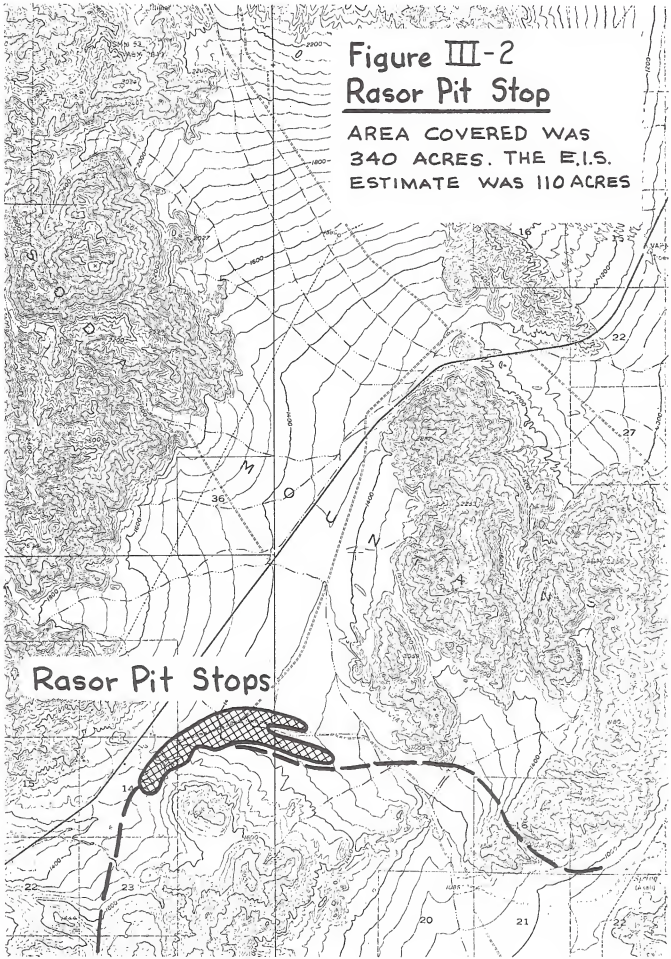


Figure III-2
Rasor Pit Stop
AREA COVERED WAS
340 ACRES. THE E.I.S.
ESTIMATE WAS 110 ACRES
Rasor Pit Stops

At the height of activity, traffic congestion occurred. Marshalling was not sufficient to maintain spectator and pit crew control. A definite hazardous condition existed with spectators both on foot and on motorcycles continually crossing the course from south to north. However, no injuries were reported in this area. No course marshal was present to assist the nearby business (gas station) during the height of activity in this area. In a post-race discussion with the owner of this business, he indicated at no time was his driveway blocked and he was able to carry out his business adequately throughout the event. He stated the attitude of the crowd and the general orderliness of the pitting operation was much improved over previous years.

Additional, or at least more aggressive, course marshalling may have controlled the spectator hazards in the actual pitting area. Utilization of signs and perhaps even a map with traffic and spectator instructions would have improved the traffic control.

SITE SPECIFIC MITIGATION 14: (SW SODA LAKE) "To moderate impact to the resources, the permittee will be required to channel the course across the fan and through the mesquite dune as identified in the field by BLM. Lath and flagging will be necessary. Immediately out of the mesquite dune, the course will be marked and flagged to keep the course on the existing road to Soda Playa (less than 1/8 mile). The crossing of the old Tonopah and Tidewater Railroad will be well

marked and flagged, and the crossing will be limited to only one location, 15 feet in width. The permittee will provide at least two course marshals."

To comply with this mitigation measure, the section captains worked out special marking procedures and established a check point. A BLM resource specialist was also present. 90% compliance was achieved. A Bureau resource specialist estimated a 20% increase in surface disturbance occurred to the cultural resources in this area. Mitigation measures for the crossing of the Old Tonopah and Tidewater Railroad were successfull in keeping the racers on the specific marked course as stipulated. However, the racers cut a 2 to 3 foot trench through the berm of the old railroad grade.

SITE SPECIFIC MITIGATION 15: (SODA LAKE CORRAL) "To avoid course cutting, the permittee will provide at least two course marshals and special care will be taken to mark course well."

The section captains determined special marking with ribbon and course markers would be necessary to obtain compliance here.

Mitigation measures were not successful in keeping the racers on the marked course. An E.S.P. plot in the area indicated that the area and number of tracks increased by 41% and that 20% of the vegetation within the plot was damaged.

SITE SPECIFIC MITIGATION 16: (C. SODA LAKE) "To moderate impact to resources, the course will be routed north via existing road and rejoined with proposed course where identified in the field by BLM."

Specific marking with ribbon, lime, and course markers were all that was necessary for complete compliance in this area. No disturbance to the cultural resource in this area was recorded.

SITE SPECIFIC MITIGATION 17: (KELBAKER ROAD CROSSING) "To protect riders, the permittee will provide proper warning markers and two course marshals to function as flagmen."

Section captains instructed flagmen that traffic on the Kelbaker Road had the right-of-way. They were to stop the racers rather than highway traffic. A check point was established here. No Bureau monitors were present during the race to determine if traffic on the road was given the right-of-way.

No injuries were reported to have occurred at this paved road crossing. About 500 spectators were present.

SITE SPECIFIC MITIGATION 18: (CI-15 UNDER CROSSING) "To avoid course cutting, the permittee will take special care to flag and mark the course well where it crosses under Interstate 15 and runs to the Powerline Road. At least two course marshals will be required."

The section captains determined that with the funneling effect of the freeway undercrossing only specific course marking would be

necessary to obtain compliance and keep the racers on the existing trail to the Powerline Road.

Mitigation measures here were successful.

SITE SPECIFIC MITIGATION 19: (S. TURQUOISE MOUNTAIN) "To avoid and/or moderate impact to resources, the course will be clearly marked and flagged in areas identified in the field by BLM. Use of existing roads may be required."

Section captains were able to keep the course on existing roads as required in this area.

Compliance here was about 90%. Indications are most of the non-compliance (tracks leaving the existing road) occurred in passing situations. These passing situations caused some aditional impact on the natural resources in the area. 3% of the vegetation within an E.S.P. plot in the area was damaged.

SITE SPECIFIC MITIGATION 20 (HALLORAN SPRINGS ROAD CROSSING) "To protect riders, the permittee will provide proper warning markers and two course marshals to function as flagmen."

Section captains instructed flagmen that traffic on the Halloran Springs Road had the right-of-way and they were to stop the racers rather than highway traffic. No BLM monitor was present to determine compliance.

No injuries were reported to have occurred at this road crossing.

SITE SPECIFIC MITIGATION 21: (BULL SPRINGS WASH) "Route course along existing route as designated in the field by BLM."

Course captains determined that the course could be routed along an existing road running parallel to the Bull Springs Wash.

Nearly complete compliance was attained. Evidence indicates most of the non-compliance was associated with passing situations. Data from the E.S.P. plot in the area indicated a 12% increase in the number and area of tracks occurred. No vegetation within the E.S.P. plot was damaged.

SITE SPECIFIC MITIGATION 22: (POMONA MINE AREA) "To protect resources and to avoid course cutting, course will be flagged and marked well and one course marshal provided."

The course utilized an existing jeep (4x4) road in this area and compliance was successful in that racers stayed on course. However, the development of "whoop-de-doos" in this road has deteriorated its integrity even for 4-wheel drive use. This road is used by a local rancher as access to some of his ranching activities. The sponsoring club will make repairs here.

SITE SPECIFIC MITIGATION 23: (VALLEY WELLS) "Pit area will be marked and flagged. At least four course marshals will be provided."

The original location (as discussed in the EIS) was determined to be too small, presenting both a safety hazard and a crowd control problem. After a discussion between the section captains and Bureau

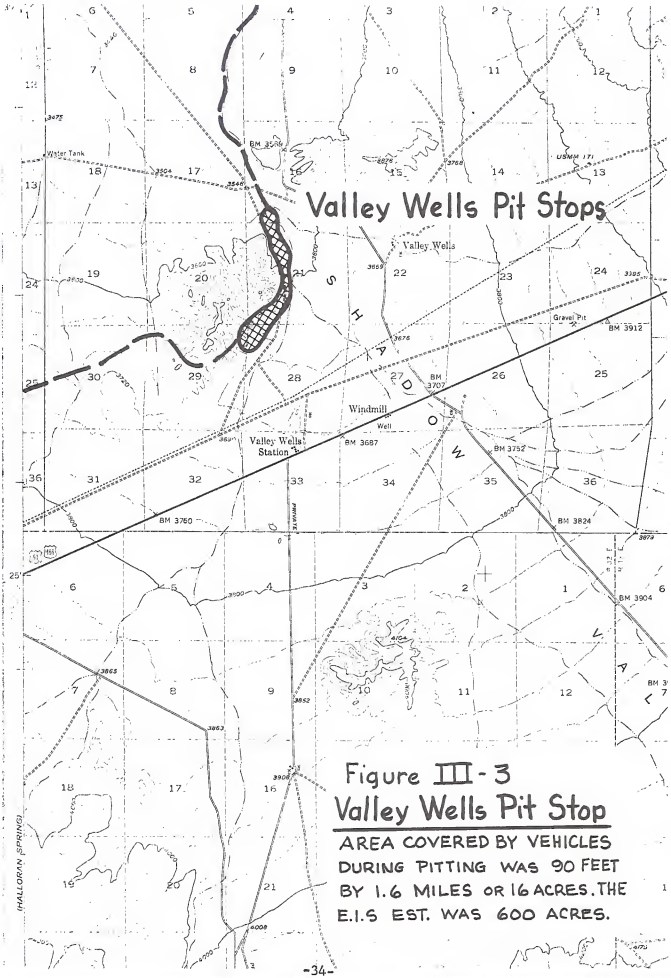


Figure III - 3

Valley Wells Pit Stop

AREA COVERED BY VEHICLES DURING PITTING WAS 90 FEET BY 1.6 MILES OR 16 ACRES. THE E.I.S EST. WAS 600 ACRES.

Resource Specialists, the pits were relocated. The new, nearby location had been used for two previous events and had excellent access and room on an existing road and trail. Resource specialists anticipated much less impact with this relocation.

The section captains determined the following would bring about compliance in the Valley Wells Area: Four course marshals were inadequate - a minimum of six are needed. The access roads for the pit crews should be well signed and marked "ONE WAY". The actual pit area should be restricted on both ends. No pitting, no parking, and no camping areas should be well signed.

Overall the compliance and orderliness in this area of high people concentration was good. However, for a brief period during the very peak of activity, the pits as a whole were not large enough and traffic control became somewhat of a problem. The portable toilet facilities were inadequate. Dust was a problem.

More and larger signs, and perhaps a handout with maps and instructions as used in the start area, would have improved the traffic control. Four more portable toilets or daily pumping of the existing units was needed and sprinkling the access roads periodically may have controlled the dust problem.

SITE SPECIFIC MITIGATION 24: (KINGSTON WASH) "Course will be confined to the Kingston Wash Bottom and will be flagged and marked to

indicate this requirement. One wide section of the wash would require extensive course marking with ribbon, lime, and course markers."

The above course marking procedures brought about good compliance. No plants were damaged within the E.S.P. plot in this area.

SITE SPECIFIC MITIGATION 25: (KINGSTON WASH NORTH) "The course will be confined to the Kingston Wash Bottom and will be flagged and marked accordingly."

The exit from Kingston Wash was a sharp (about 110°) right-hand turn up a much smaller wash requiring heavy ribboning across the entire wash, directional arrows, and danger and slow lime marks. The club was confident that no flagmen were needed.

The turn proved to be too sharp for the approach and for the speed. 95% of the riders missed the actual turn out of the wash and formed a new trail. As an E.S.P. plot was not located here, no precise assessment of the damage was made. Both the area of influence and area of impact was increased.

SITE SPECIFIC MITIGATION 26: (EXCELSIOR MINE ROAD NORTH) "To protect riders, the permittee will provide proper warning markers and two course marshals to function as flagmen."

To protect riders, the club would provide proper warning markers and at least two course marshals. It was impressed on the club that the riders would be stopped and not the traffic using the road.

A check point would be established requiring the riders to stop long enough to have their tank cards marked.

Four course marshals and three number recorders were present during the race. 1,811 riders passed through this check point.

Some spectator parking was observed along the road near the crossing. No injuries were reported.

SITE SPECIFIC MITIGATION 27: (MESQUITE PASS) "To avoid course cutting and impact to resources, the course will be closely marked and flagged. At least two course marshals will be required."

A check point with at least two course marshals was established at this point to prevent course cutting and possible damage to an upland game bird guzzler which was located about 150 yards from the check point.

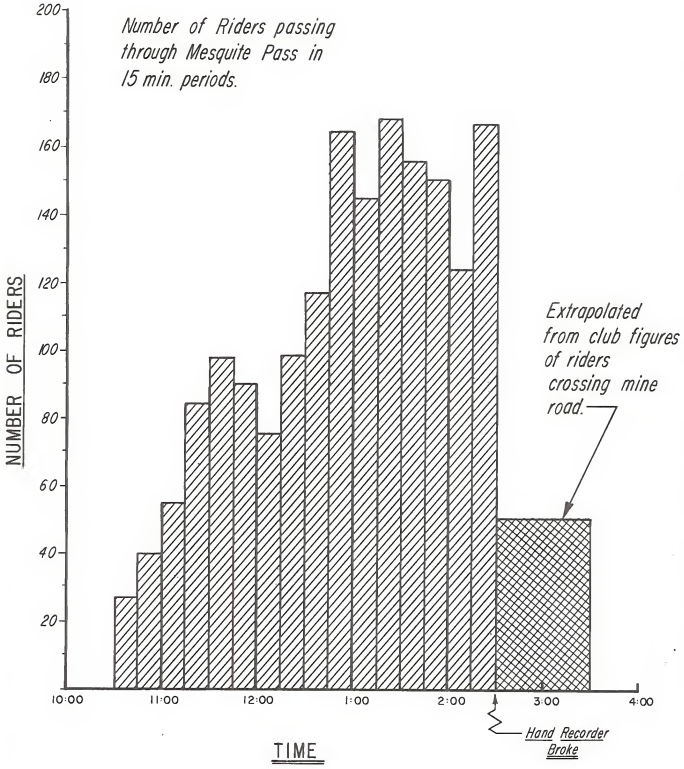
Total compliance was obtained here with all 1,770 of the racers passing through this check point observed to be on the prescribed course. Table III-2 shows the numbers of riders passing through this check point during each 15-minute period.

SITE SPECIFIC MITIGATION 28: (STATE LINE PIT STOP) "The pit area will be marked and flagged; at least four course marshals will be required."

Section captains determined that lime marking and course marshals would be adequate to insure compliance here. The approach

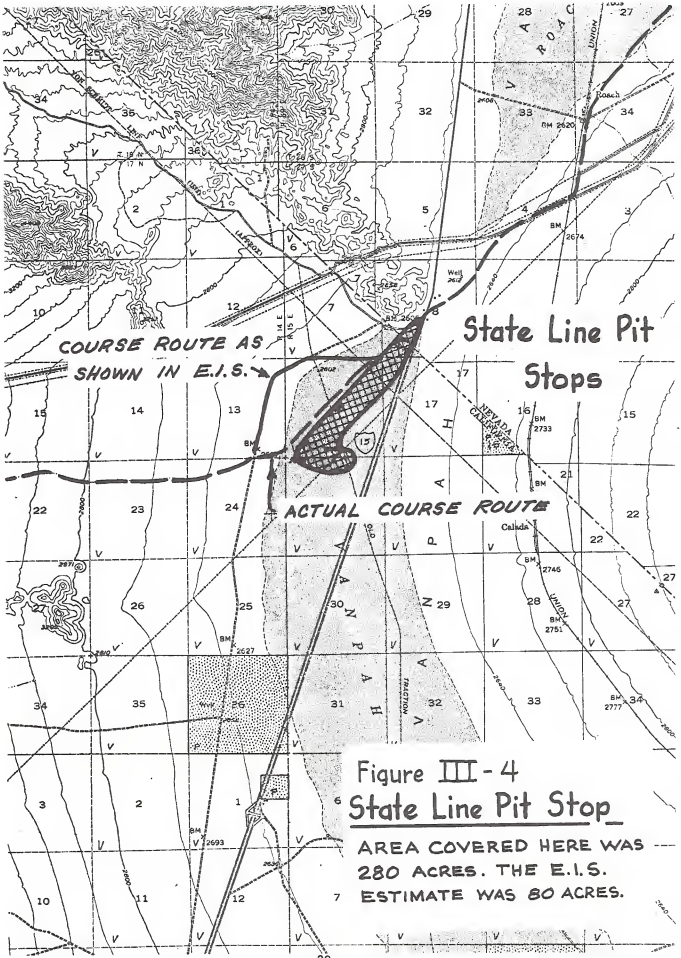
TABLE III-2

MESQUITE PASS



into the pits was to be closely marked to keep the course on an existing road onto the dry lake bed. An arc-shaped lime barrier line was placed across the lake bed to keep the spectators and pit crews out of the way of the racers.

Compliance here was good. The arc-shaped barrier line, coupled with alert course marshals, was effective in keeping people out of the race route. All racers stayed in the existing road leading onto the dry lake bed. No disturbance occurred to the cultural resources in this area.


COURSE ROUTE AS SHOWN IN E.I.S.
ACTUAL COURSE ROUTE
State Line Pit Stops
Figure III - 4
State Line Pit Stop
AREA COVERED HERE WAS 280 ACRES. THE E.I.S. ESTIMATE WAS 80 ACRES.

One problem developed when racers who had missed their pit crews doubled back to look for them, travelling head on toward other racers. Perhaps having a designated corridor for racers doubling back would correct this hazard.

The only known race-related fatality occurred here on Friday afternoon prior to the race. Miss Bonnie Lou Phillips, the driver, was killed in a dune buggy accident. Course marshals had reportedly warned Miss Phillips a number of times concerning her high rate of speed and while traveling she should have her seat belt fastened. All warnings went unheeded.

SITE SPECIFIC MITIGATION 29: (ROACH LAKE RAILROAD CROSSING) "Course will cross railroad right-of-way at existing crossing in Section 4. Two course marshals will be provided to function as flagmen."

The railroad itself posed no compliance problem and was adequately controlled by the two flagmen present.

Compliance was not complete through a sharp 100° turn just beyond the railroad crossing. About 5% of the first wave and 10% of the second wave made a wide turn, increasing the area of influence. The course in the turn was marked well and a flagman was present. Excessive acceleration after the slowdown for the railroad crossing undoubtedly contributed to the problem.

SITE SPECIFIC MITIGATION 30: (SHEEP MOUNTAIN SOUTH) "To avoid course cutting and to reduce impact to resources, specific care will be taken to mark and flag course well. A course marshal will be provided."

To adhere to this mitigation measure, a check point was established where the course made a 90° left turn from the powerline access road.

The stops for both waves of riders were orderly. Significant widening of the course did occur in the acceleration area following the stop at the check point. Less sure racers teetered and swerved in attempts to regain forward motion resulting in some spills.

SITE SPECIFIC MITIGATION 31: (S. JEAN LAKE) "Permittee will provide at least one course marshal and closely mark and flag the course."

Through this cross country section, tall vegetation prevented the effective use of lime. More use of yellow ribbon on the tops of the vegetation would have provided a line-of-sight for racers to follow and would have helped them to avoid weaving in search of lime bags. Because the course was straight after the turn at site specific mitigation point #30, the racers usually followed the existing tracks rather than course cutting.

Access into this area was limited, and a BLM monitor was not available to be stationed there throughout the race. Because of the hazard involved in going into the area on the race course, Bureau roving monitors did not get into the area until immediately following the race.

SITE SPECIFIC MITIGATION 32: (FRONTAGE ROAD CROSSING) (LAS VEGAS BOULEVARD) "The permittee will provide warning markers and two course marshals to function as flagmen."

Traffic was to be given the right-of-way and racers were to be stopped.

The course marshals gave the racer the right-of-way and traffic was stopped whenever a rider came through. Heavy traffic, most of which was not race associated, traveling at a high speed (50 MPH plus) occurred here. The traffic control was poorly coordinated and by late afternoon became quite "lackadaisical." This often caused the motorist to not know if the flagman was signaling a stop or go. The situation was further complicated by the many non-racing minibikes speeding around the area and up and down the highway, as well as by the lack of off-highway parking for race spectators. Spectators were forced to park half on and half off of the highway, which restricted the flagman's vision and the flow of traffic. No injuries occurred here.

SITE SPECIFIC MITIGATION 33: (COUNTY ROAD CROSSING) (SLOAN ROAD CROSSING) "The permittee will provide warning markers and two course marshals to function as flagmen."

Vehicle traffic on the road was to have the right-of-way. The course marshals here again stopped highway traffic whenever a rider came through.

Traffic here was light and most of it was associated with the race. Course marshals were careful to ask spectators to park so as not to restrict their view of traffic. No injuries occurred here.

SITE SPECIFIC MITIGATION 34: (FINISH) "The finish area will be marked and flagged. Spectator, pit, and camping areas will be designated. At least 6 course marshals will be provided. The spectator parking access dirt routes will be watered an hour before and during the arrival of spectators and as necessary to keep the soil moist and free of dust during the period of occupation by spectators. Water will be applied at the rate of 2,000 gallons per acre or more as determined by BLM."

A quantiative analysis of the compliance at the finish area is difficult to determine. The lack of a flag line funnel leading to the finish chute caused some problems to early finishers. (BLM personnel constructed a flag line after a "near miss" incident.) A large crowd bunched around the finish chute and blocked the racers' view of the finish chute, creating a hazard to those participants still racing against each other. In one observed instance, an accident was avoided only by a rider's skill in handling his motorcycle.

There was one traffic accident with injury in which traffic congestion was undoubtedly a factor. A race participant who had just finished the race was struck by a car while walking on the Blue Diamond-Pahrump Highway at about 6:20 p.m. At that time, traffic was extremely congested in the east-bound lane and nearly clear in the west-bound lane.

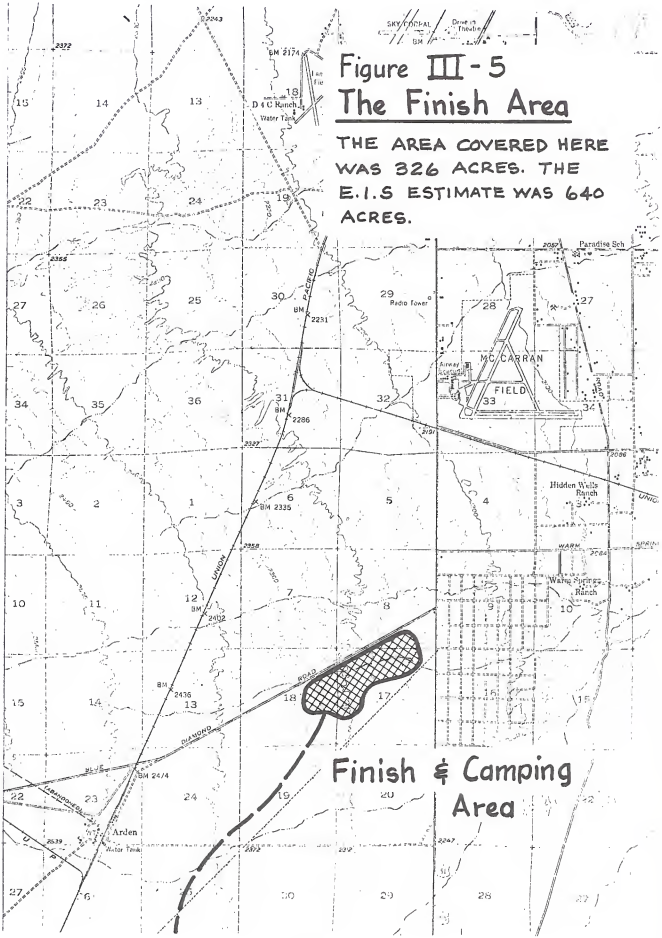


Figure III-5
The Finish Area

THE AREA COVERED HERE WAS 326 ACRES. THE E.I.S ESTIMATE WAS 640 ACRES.

Cars were parked almost bumper to bumper along both sides of the highway. A witness at the accident scene indicated that the pedestrian was walking around a vehicle parked just off the edge of the roadway when struck by an auto traveling west.

Club members directed traffic into the parking area from the intersection of Blue Diamond-Pahrump Road only until the first finishers arrived.

The parking signs constructed by the club were too small and were ignored by most of the motorists when the traffic became congested. Motorists also ignored the traffic barricades all along the Blue Diamond-Pahrump Highway and parked along the roadway, often two abreast.

At around 2:00 p.m., three motorcycle units of the Las Vegas Metropolitan Police Department began to direct traffic. They continued until after 6:00 p.m.

Traffic flow at the Blue Diamond-Pahrump Highway and Industrial Road Intersection was counted two different times on race day.

1:00 p.m. - 13 cars per minute (no traffic control present)

3:00 p.m. - 20 cars per minute (traffic control present)

Pit racers were kept reasonably well in check during the morning. After the large concentrations of finishers began arriving it was impossible to keep track of all the motorcycles and riders around the finish area. Other vehicles (spectators and pick-up crews)

trying to gain access to the immediate finish area were also kept in check only until the race finishers began to arrive.

The water truck did not arrive until almost noon. One load of water was sprinkled around the finish line and about the last 1/8 of a mile of the course. This was effective in controlling the dust in the immediate finish area.

The lack of any wind at all on race day made dust conditions severe along the race course. The dust lay on and around the course throughout the race, resembling a giant snake when viewed from a distance. Because of this lack of wind, the dust dissipated over a much smaller area than had there been a wind blowing.

The first two finishers arrived simultaneously around 11:30 a.m. with several other riders finishing shortly thereafter. The main bulk of finishing riders did not start arriving until around 12:30 p.m. to 1:00 p.m. It was not until around 6:00 p.m. that the last of the 1,580 finishers arrived.

Litter and trash cleanup began as soon as the racing activity subsided. The E.I.S. stated that compliance with this stipulation required all trash and litter generated by the event at the start, pits, finish, along the course, and in the camping and spectator areas must be cleaned up. Compliance has been met in the start, pits, and finish areas. Most of the course has also been cleaned up. Some ribbon and course markers still remain on two small sections of the course. The compliance bond will not be released until complete compliance has been obtained.

Four items to implement finish mitigation measures that had been agreed on by course captains prior to the race were overlooked or done inadequately and are as follows:

(1) The bunting, which was to be strung along the barricades on the Blue Diamond-Pahrump Highway, was never put up.

(2) The parking signs constructed were too small and too few in number.

(3) The flag line funnel leading to the finish chute was not constructed until during the race finish.

(4) The portable toilets were not placed in the appropriate locations in relationship to the finish line and concessions.

IV. RESOURCE IMPACT

A. Impact on Soils

1. Objectives

The immediate objective of the soil sampling procedure was to determine the impact of the race on soils disturbed by the race. In order to meet this objective, it was necessary to quantify the physical properties of the various soil types that would be traversed by the vehicles both before and after the event.

Soil properties described and measured include:

Soil profile horizons

Texture

Structure

Color

Consistency

% stones or desert pavement fragments

Reaction (pH)

Moisture content

Shear strength

Penetration factor

Bulk density

Long term objectives are twofold: (1) to compare the results obtained in the above examination with the properties of similar soils in a relatively virgin and undisturbed condition; and (2) to determine the effects of normal weathering processes in restoring soil

physical properties to soil surfaces and profiles altered by the actions of vehicle events. These long term objectives will require periodic sampling and monitoring of both undisturbed soil sites previously unsampled and of those Environmental Sampling Plot (E.S.P.) soils sampled and described in this report.

2. Methodology

The procedures used in determining the previously itemized soil properties during the fore and after sampling periods are identical to those procedures used in approved USDA Standard Soil Survey Techniques. Soils were identified to the Series or Series Association level of taxonomy where possible. Textures, relative quantities of sand, silt, and clay, were identified by visual observation and feel in each horizon of the profile. Structure in terms of single grain, crumb, vesicular, platy, columnar, etc., was similarly identified. Color determinations of horizons were made with the use of the Munsell Soil Color Handbook. Consistency in terms of standard soil descriptive terminology such as soft, floury, harsh, plastic, etc., were determined by feel and visual observation in line with manualized procedures. Percent stones or desert pavement fragments were estimated by visual observation of each soil horizon. Reactions (pH) were made with the use of the Helig Soil pH kit. Moisture content of soil horizons was estimated in the field. Shear strength and penetration factors were determined in the field on soil surfaces and horizons with the use of accepted shear strength and penetration instruments. Bulk density samples, weight per volume, were collected at each E.S.P.

site and analyses were made at a commercial soil laboratory. Where surface gravels were present, one foot square samples were collected and submitted for laboratory analysis. Recordings of the data at each E.S.P. site were made on BLM Form 7310-9. These completed forms are on file.

Analyses of the above properties, taken before and after the race, individually and collectively, indicate whether the various soils had been altered as a result of the race and to what extent.

One significant natural event that may have further altered the post race soil condition was the occurrence of an unseasonal rainfall over the entire course. Approximately one week had elapsed after the rain before the second set of samples were made. A number of the "post race" samples evidenced crusting and slight surface cementing as might be expected. It is not known to what degree the rain and subsequent drying influenced the physical soil properties. It would appear safe to assume that bulk densities, shear strength, and penetration factors would be slightly increased, at least in the surface horizons, due to compacting action of the raindrops on the soil.

3. Findings

a. Bulk Density and Gravel Sample Analysis - Two-thirds of the comparison samples taken "after" the race indicated compaction occurred, although the amount of compaction doesn't appear to have appreciated greatly above that existing on the course prior to this year's event.

The MA (Mojave-Adelanto) and RP (Rosamond-Playa) associations were evenly separated between compaction and soil structure breakdown.

Nine of eleven sample plots of the AC (Anthony-Cajon-Arizo) association indicated compaction occurred.

A few of the plots indicated soil structure breakdown occurred. Some of these were situated in very sandy, loose soil structure sites (Nos. 1, 2, and 12), or at a course turning point (No. 11). Some were at high vehicle concentration points where the race track path was narrowed to approximately five feet wide (Nos. 4, 12, 22, and 24). However, the same was true of some plots that were compacted (Nos. 8, 11A, 12, 16, 18, 21, 22, and 23). Possibly specific soil structures could account for these differences.

The most evident occurrence was compaction, throughout all soil associations.

Table IV-A-1

Bulk Density Analysis by Soil Associations

MA	(Mojave-Adelanto)	AC	(Anthony-Cajon-Arizo)
1	+ .1230	9	+ .1476
1A	*	10	+ .1184
2	- .0746 very sandy site	11	- .0769 turning point, very sandy
3	*	11A	+ .1638
		12	- .0519 narrow wash site - tracks concentrated
RP	(Rosamond-Playa)		
4	- .0660 tight soil - tracks concentrated	13	*
		16	+ .3287
7	+ .3129	17	+ .2891
8	+ .0064	18	+ .3242
20	- .0296	23	+ .2402
21	+ .0532	25	+ .5988
24	- .1471 tracks concentrated	26	+ .9681

AD	(Arizo-Daggett)	GR	(Rockland)
5	+ .3020	14	*
6	*	15	*
		19	*
CJ	(Cajon)) omitted	22	- .0741 Beer Bottle Pass - tracks very concentrated in narrow wash
DU	(Duneland)		

+ represents soil compation occurred

- represents soil structure breakdown occurred

* no bulk density analysis made

Bulk Density by E.S.P. Site and Surface Gravel Weights

Bulk Density = $\frac{\text{grams}}{\text{cc}}$

Plot No.	Soil Assoc.	Soil Samples Before	Soil Samples After	Variation		Gravel Samples Before	Gravel Samples After	grams/sq.ft. Difference
1	MA	1.4770	1.6000	+ .1230	Sandy-scattered gravel cover	213	X (same)	no change
1A	MA	X	2.1703		same as 1	X	0	gravels displaced
2	MA	1.8000	1.7254	- .0746	Sandy site	X	X	sandy
3	MA	1.9848	X		No comparison pit made	X	X	---
4	RP	1.5371	1.4711	- .0660	Sealed surface. Very tight soil	X	X	---
5	AD	1.5371	1.8391	+ .3020	Desert pvmt. Gravels to coarse rock	791	1076	+ 285
6	AD	X	X		same as 5	X	X	---
7	RP	1.4054	1.7183	+ .3129	Sandy-surface caked-crusted-E. Cronese Dry Lake	X	X	---
8	RP	1.3945	1.4009	+ .0064	Surface cracked appearance-clods. W. Cronese Dry Lake	X	X	---
9	AC	1.9981	2.1457	+ .1476	Sandy site w/large stones	574	793	+ 219
10	AC	1.9229	2.0413	+ .1184	Sandy site-gravel covered	613	745	+ 132
11	AC	1.7787	1.7018	- .0769	Sandy site-gravel covered	172	0	- 172
11A	AC	1.6139	1.7777	+ .1638	Sandy site-dry lake site-E. Soda Lake	X	X	---
12	AC	2.1239	2.0720	- .0519	Sandy wash-gravels	1547	405	- 1142
13	AC	X	X		same as 12	X	X	---
14	GR	1.6737	X		No comparison pit made	490	X (same)	no disturbance
15	GR	1,9000	X		No comparison pit made	328	X (same)	no disturbance
16	AC	1.8931	2.2218	+ .3287	Gravels displaced completely from trail area	1632	0	- 1632
17	AC	1.9259	2.2150	+ .2891	Sandy wash no gravels	X	X	---
18	AC	1.8241	2.1483	+ .3242	Sandy wash-scattered gravels	615	371	- 244
19	GR	1.9116	X		No comparison pit made	362	X	no disturbance
20	RP	1.7046	1.6750	- .0296	Ivanpah Lake-caked surface-tight soil	X	X	---
21	RP	1.6562	1.7094	+ .0532	Sandy site-Roach Dry Lake	X	X	---
22	GR	2.0377	1.9636	- .0741	Sandy wash-gravel covered - Beer Bottle Pass	1042	928	- 114
23	AC	1.7116	1.9518	+ .2402	Sandy wash-gravel covered	155	428	+ 273
24	RP	1.5671	1.4200	- .1471	Sandy-very fine-Jean Dry Lake	X	X	---
25	AC	1.1731	1.7719	+ .5988	Surface churned and appears cemented	1187	0	- 1187
26	AC	1.2187	2.1868	+ .9681	same as 25	562	0	- 562

Table IV-A-2

b. Shear Strength Analysis - The most signficant shear strength variations between "Before" and "After Race" appear predominantly in the RP (Rosamond-Playa) Associations. These sites are on dry lake beds.

Two exceptions were on the AC (Anthony-Cajon-Arizo) Associations. Site No. 9 was in a sedimentation area of a prominent drainage (very similar to a dry lake situation), and Site No. 11A was adjacent to a dry lake. This last site was located near the boundary line between the RP and AC Associations - and could be on RP soil - hence similar shear strength characteristics.

The variations reflected indicated compaction occurred on the dry lake beds finely textured soils from the surface to depths of 12"+. These soils are very tight with hard, smooth surfaces.

Some of the soil surfaces appeared cemented after the race. This could be an effect caused by the rain right after the race. It is not known if higher readings at these sites are due entirely to the race impact or partially by the compaction and solution caused by rain.

Shear Strength Analysis

Plot No.		Surface Before	Surface After	0 - 6" Before	0 - 6" After	6" - 12" Before	6" - 12" After	12" + Before	12" + After	
1	MA	0	0	0	0	.32	.15	.13	.30	Ave. B-1 & B-2 for 6-12". Moisture to 2". A-1 & B-1 Ave. for 0-6".
1A	MA		.05	–	.17	–	.40	–	.55	No before comparison. Surface churned extensively.
2	MA	0	0	0	0	0	0	0	0	Very sandy site - moisture to 4½".
3	MA	0	–	.02	–	0	–	0	–	No after comparison
4	RP	3.6	2.5	4.0	2.5	3.0	4.0	–	–	Surface appears cemented
5	AD	0	.1	.12	.1	.28	.17	.25		In hard rock. Moisture to 3"
6	AD	–	–	–	–	–	–	–	–	Same as 5. No sample taken
7	RP	.1	2.0	.015	.54	.33	1.0	.95	–	A-11 & A-12 Ave. for 0-6". Surface caked, crusted, cemented appearance
8	RP	.1	2.0	.09	2.4	.27	4.0	–	–	Surface cracked, hard clods, sandy site w/large stones-very loose. Ave. A-11 & A-12 for 0-6".
9	AC	.12	1.0	.14	1.5	–	–	–	–	Moisture to 6"
10	AC	.02	.0	.05	.15	.04	.20	–	–	Moisture to 12". A-1 & B-1 ave. for 0-6". Surface churned up.
11	AC	.0	.0	.18	.12	.12	.10	–	–	Moisture to 10".
11A	AC	.8	1.0	.52	3.2	.18	4.7	–	–	Moisture to 3". Soil very tight-appears cemented.
12	AC	.12	.20	.11	.45	.18	.15	.22	.25	Surface to 6" very tight - appears cemented.
13	AC	–	–	–	–	–	–	–	–	Same soil type as 12 - no samples taken
14	GR	.13	–	.1	–	.6	–	.2	–	No comparison sample taken
15	GR	.15	–	.25	–	–	–	–	–	No comparison sample taken. A-11 & A-12 ave. for 0-6".
16	AC	.49	.35	.18	.43	.57	.40	–	–	Moisture to 10". A-1 & C-1 ave. for 0-6". Surface very sandy - churned up.
17	AC	.5	.0	.55	.03	.2	.15	.3	.17	Moisture all way down. Ave. A-1 & B-1 for 0-6".
18	AC	.03	.0	.03	.12	.37	.20	–	–	Moisture to 7".
19	GR	.28	–	.18	–	.31	–	.21	–	No comparison samples taken. Surface crusted, caked very hard.
20	RP	1.0	.6	.37	.57	.35	.62	–	–	Moisture to 5". Course churned up after.
21	RP	.02	.05	1.2	.15	7.5	.40	–	–	Moisture to 9".
22	GR	.18	.45	.1	.15	.14	.15	–	–	Moisture to 16"+. Very loose surface.
23	AC	.01	.0	.09	.0	.1	.05	–	–	Moisture to 18"+. Soil very fine - siltlike.
24	RP	.37	.04	.07	.10	.25	.35	–	–	Moisture to 6". Surface churned and crusted.
25	AC	.16	.40	.14	.20	.24	.25	–	–	Moisture to 6". Surface churned - cemented.
26	AC	.2	.4	.22	.32	.18	.25	–	–	Moisture down to 8".

c. Penetration Analysis - Variations in this factor appeared predominantly in the RP (Rosamond-Playa) and AC (Anthony-Cajon-Arizo) Associations.

RP Rosamond-Playa Association - These soils are on dry lake beds. Penetration readings on these soils indicate that compaction occurred nearly uniformly. The 0-6" reading for Plot No. 20 is an exception, for which there is no apparent explanation. Plot No. 24 was the other exception. This site is on the edge of Jean Dry Lake, which did not have the hard, smooth surface. After the race the soil was very churned up and loose, resulting in a very fine, silt-like soil, and a reduced penetration reading.

AC Anthony-Cajon-Arizo Association - Penetration readings on these soils were predominantly higher after the race, indicating compaction occurred from the surface to depths of 12"+.

These are sandy soils on nearly level to sloping fans. A question arises "why the higher surface readings on sandy soils?" A probable answer is the binding, cementing effect caused by the rain that occurred desert-wide shortly after the race. These soils exhibited a crusting, cementing surface appearance at most plot sites, and especially so at Plots Nos. 25 and 26.

Lower penetration readings were found at Plots Nos. 11 and 26. No. 11 was a very sandy site at a sharp turning point. Possibly the pressures exerted at this point were more

diagonal to ground surface, rather than vertical, which could have caused a breakdown of soil structure rather than compaction.

Site No. 26 was at the end of the race course. Possibly the intense traffic milling and turning caused soil structure breakdown rather than compaction.

Once again, as in surface readings of shear strength, some of the sites had a cemented surface appearance. It is not known if higher surface readings after the race is due to wheel impact or the rain.

Penetration Analysis

Plot No.		Surface Before	Surface After	0-6" Before	0-6" After	6-12" Before	6-12" After	12"+ Before	12"+ After	
1	MA	.2	.0	.1	.0	2.65	3.5	4.2	4.5	Ave. B-1 and B-2 for 6-12".
1A	MA	–	.7	–	1.2	–	4.5+	–	4.5	Ave. A-1 and B-1 for 0-6".
2	MA	.4	.0	.15	.3	.5	.6	–	–	Ave. A-11 and A-12 for 0-6".
3	MA	.3	–	.1	–	.2	–	1.0	–	No after comparison.
4	RP	3.6	3.4	3.0	3.5	4.5+	4.5+	–	–	Very tight soil.
5	AD	.1	1.2	1.2	1.2	3.5	2.7	4.5+	4.5+	Hard rock.
6	AD									Same as 5 - no comparison taken.
7	RP	.3	.27	.15	1.6	2.5	4.5+	–	–	Ave. A-11 and A-12 for 0-6".
8	RP	.7	1.0	.7	1.9	4.5+	4.5+	–	–	Ave. A-11 and A-12 for 0-6".
9	AC	1.0	2.5	4.5+	4.5					Sandy loam.
10	AC	.6	.5	.25	1.15	1.7	4.5+			Sand.
11	AC	.5	.7	2.9	.65	3.4	.7			Ave. A-1 and B-1 for 0-6". Gravelly loam.
11A	AC	4.5+	4.5+	4.5+	4.5+	4.5+	4.5+			Soil very tight.
12	AC	2.2	4.5	.2	4.5+	.75	1.5	1.1	3.0	
13	AC	–	–	–	–	–	–	–	–	Same as 12 - no comparison taken.
14	GR	.7	–	2.0	–	.7	–	1.3	–	Roadway - no comparison taken.
15	GR	1.1	–	1.5	–	–	–	–	–	Roadway - no comparison taken.
16	AC	3.6	4.5+	3.3	4.3	4.0	4.25	–	–	Ave. A-11 and A-12 for 0-6".
17	AC	.7	.0	.65	.8	.8	1.5	1.0	3.0	Ave. A-1 and C-1 for 0-6".
18	AC	.7	4.5	.45	2.1	1.1	4.5	–	–	Ave. A-1 and B-1 for 0-6".
19	GR	2.6	–	.4	–	2.0	–	3.3	–	Roadway - no comparison taken.
20	RP	4.5+	4.5+	4.5+	2.5	4.5+	4.5+	–	–	
21	RP	.3	1.0	.9	.7	4.5+	4.5+	–	–	
22	GR	2.2	2.0	.6	1.5	1.5	1.7	–	–	Beer Bottle Pass - intensely concentrated point up a very narrow wash area.
23	AC	.9	.0	.1	.5	.8	.7	–	–	Fine sand - no horizon breaks.
24	RP	2.8	.2	.75	.5	4.0	3.5	–	–	Soil very fine - silt-like.
25	AC	.8	3.7	.14	4.5	3.25	3.0	–	–	
26	AC	1.2	4.5+	1.0	.7	4.5+	2.0	–	–	

Penetration Analysis
by E.S.P. Site and Soil Association

Table IV-A-5

RP (Rosamond-Playa) Association

Plot No.	Surface	0-6"	6-12"
7		.15-1.6	2.5-4.5+
8	.7-1.0	.7-1.9	
20		4.5+-2.5	
21	.3-1.0		
24	2.8- .2		

AC (Anthony-Cajon-Arizo) Association

Plot No.	Surface	0-6"	6-12"	12"+
9	1.0-2.5			
10		.25-1.15	1.7-4.5+	
11		2.9 - .65	3.4- .7	
12	2.2-4.5	.2 -4.5+	.75-1.5	1.1-3.0
16	3.6-4.5+	3.3-4.3		
17			.8-1.5	1.0-3.0
18	.7-4.5	.45-2.1	1.1-4.5	
25	.8-3.7	.14-4.5		
26	1.2-4.5+	1.0- .7	4.5+-2.0	

d. Soil Association Analysis -

Soil Associations Represented:	No. of Sample Plots Each
AC (Anthony-Cajon-Arizo)	12
AD (Arizo-Daggett)	2
CJ (Cajon)	0
DU (Duneland)	0
GR (Rockland)	4
MA (Mojave-Adelanto)	3
RP (Rosamond-Playa)	6
	27

Plot No. 3 was intended to be in the CJ Association, but was erroneously located in the MA Association. Consequently, no CJ sample was taken.

Only a very small portion of the DU Association was affected by the race course. No sample plot was taken.

MA MOJAVE-ADELANTO ASSOCIATION

These soils were located at the beginning portion of the race course (Plots Nos. 1, 1A, 2, and 3). Analysis by plot is as follows:

Plot No. 1 - Compacted slightly, with very little gravel displacement. Increased vehicle tracks over a widely dispersed area. This site is behind the race start line (west).

Plot No. 1A - Readings for this site were taken after the race - no before sample was taken. This site, approximately 300 yards in front of the race start line, is similar to No. 1. Comparison of "after race" results show Site No. 1A having higher shear strength and penetrometer readings than Site No. 1. The tracks here were concentrated in 6-foot wide paths.

Plot No. 2 - Located on a small sandy hill. The surface was churned up extensively. Soil structure breakdown occurred here.

Plot No. 3 - This site is south of the powerline road on the south edge of the start area triangle. No cycle tracks crossed this site. They apparently stayed on the road, and north of it, and converged onto the narrower race course beyond this point. No comparison sample was taken. The "before race" readings of this site are very similar to Site No. 2.

Both compaction and soil structure breakdown occurred in this soil association. Compaction occurred on Sites Nos. 1 and 1A, which were of a tighter soil structure than No. 2. Site No. 2 was a sandy, loose structured soil on a low sandy hill about 350 yards in front of the race start line. Readings at this point, after the race, indicated further soil breakdown had occurred although the variation does not appear to be very much.

Site No. 3 was not impacted.

RP ROSAMOND-PLAYA ASSOCIATION

These soils are representative of the dry lake beds crossed by the race course. They include Plots Nos. 4, 7, 8, 20, 21, and 24.

Plots Nos. 4, 20, and 24 showed slight soil structure breakdown, whereas Nos. 7, 8, and 21 show compaction occurred.

The penetration readings showed more significant changes on these soils than the other factors. Compaction occurred predominantly from surface to 6" depths. Sites Nos. 4 and 24 showed a soil structure breakdown, but only slightly. The "after race" readings for these sites were taken at high vehicle traffic concentration points which probably caused the breakdowns because of the intense pounding effects (race track course 5 feet to 6 feet wide). Site No. 24 was on the edge of Jean Dry Lake, where the soil was of a looser structure than that out further in the lake bed. Site No. 20 shows a variation in the 0" to 6" area, but none on the surface. There is no apparent explanation for this, except possibly an incorrect reading taken.

AD ARIZO-DAGGETT ASSOCIATION

These are gravelly, sandy soils found on nearly level to sloping fans and low terraces. They represent a minor portion of the race course. Only two sample plots were established on this soil association.

Plots Nos. 5 and 6 were established on the sloping fan west from West Cronese Lake. Since the two sites were close together and on similar soils, only one "after race" comparison plot was made. Plot No. 5 indicated compaction occurred. Approximately 3/4 of the surface gravel cover was removed (displaced).

This particular plot site was a very tight soil with rock inclusions. Test results showed compaction occurred at a higher than average degree. Also, the "after race" penetration test of soil surface was much higher than before, but it isn't known if this is due to motorcycle impact or to the rain that came right after the race.

GR ROCKLAND ASSOCIATION

These granitic outcrop soils were found in upland areas. The race course over these soils was mostly on existing roadways.

Plots Nos. 14, 15, and 19. These sites were roadways that the racers used for the race course. It was felt that too much danger to race participants would be created by digging sample plot pits in these roadways, and that the impact on the already highly compacted roadways wouldn't be enough to warrent creating a dangerous condition to race participants.

Plot No. 20 was in a narrow, rocky wash which channeled the vehicle traffic into a very high concentration of race track, approximately 10 feet wide. Only slight compaction occurred here.

Test results indicated very slight compaction occurred, and that little or no other impact changes occurred on these soils.

AC ANTHONY-CAJON-ARIZO ASSOCIATION

These are sandy to gravelly alluvium soils, found on nearly level to sloping fans. Most of the race course was on these soils.

Analysis of Plots Nos. 9, 10, 11A, 16, 17, 18, 23, 25, and 26 showed that compaction occurred. Soil structure breakdown occurred at Plots Nos. 11 and 12.

Plot No. 9 was a sandy site with nearly solid gravel cover (gravels from small pebbles to stones of 2 to 3" diameter), situated on a sedimentation bench of a drainageway. Compaction occurred here. Also, there was an increase of surface gravels and stone cover. Since compaction occurred here, the increased gravels could be due primarily to the scattering effect by racers. This site is at a turning point of the race course, which would contribute to gravel displacement occurring - decreased at some points, increased at others. The increase does not appear to be the result of churning action at this point.

Plot No. 10 - This sandy site is covered with surface gravel. Compaction occurred here. Surface gravel cover increased, apparently due to displacement and scattering action by racers.

Plot No. 11 - This is a very sandy site with moderate surface gravel cover. Soil structure breakdown occurred here. This site is situated at the bottom of a small sand dune, which the racers came down, and at a sharp turning point of the race course. An assumption for soil structure breakdown here could be that at this turning point the pressures exerted by the racers was at a diagonal angle to ground surface, rather than vertical, which caused soil structure breakdown rather than compaction. Also, the surface gravel cover was completely removed (displaced) over the complete width (approximately 50 feet) of the turning point, and the surface was churned up extensively.

Plot No. 11A - This is a site of tight soil at the edge of a small playa (east side of Soda Dry Lake). Compaction occurred here. The surface had a cemented appearance.

Plot No. 12 - This was the only other AC soil site that indicated soil structure breakdown occurred. This site, situated in a narrow, sandy wash, had a moderate surface gravel cover. At this point the race course narrowed down into this wash to approximately a 10-foot width. Possibly the intense concentration of vehicle traffic had a pounding effect caused soil structure breakdown rather than compaction. Surface gravel displacement was extensive at this site.

Plot No. 13 - Similar to No. 12, no samples taken.

Plot No. 16 - This site was at a pit area. Compaction occurred, and there was complete displacement (removal) of surface gravels on the narrow race course path just adjacent to the pit area.

Plot No. 17 - A sandy wash site. Compaction occurred.

Plot No. 18 - Another highly concentrated vehicle traffic point where race course followed a narrow wash (6 feet wide+). Test results indicated higher than average compaction occurred here.

Plot No. 23 - Very sandy, narrow wash (10 feet +), very loose soil structure with surface gravel cover extensive. Compaction occurred and surface gravel increased. Two possibilities for this are:

(1) churned up from below surface, and/or

(2) drift downhill.

This site is on a sloping fan of approximately 5% grade.

Plot No. 25 - Compaction was much higher than average. Surface gravel displacement from the concentrated track paths was complete at this point. Surface was highly churned up, crusted, and appeared cemented.

Plot No. 26 - Located at the finish of race course; test results indicated this site as being the most compacted of all sites. All surface gravels were displaced (removed) from the concentrated race course tracks. Surface was highly churned up, crusted, and appeared cemented.

These AC soils showed wider variation results than the others. Nine of eleven plots indicated compaction occurred. Soil structures varied from fine sand to gravelly loam, with surface gravel cover ranging from sparse to dense. Surface gravel cover "after race" indicated from small increases to complete removal occurred.

CJ CAJON ASSOCIATION

Approximately 5 miles of the race course crossed this soil association. Plot No. 3 was intended to be in this soil association, but was erroneously located in the MA association, hence no sample plot was taken in this association.

DU DUNELAND ASSOCIATION

The race course missed most of the Duneland Association. It barely touched the edge of one such area near the south edge of East Cronese Lake. This was inadvertently overlooked when the ESP plot sites were established and, consequently, no plot sample was taken in this association.

B. Impact on Vegetation

1. Objective

The short-term objective of the vegetation plot analysis was to determine the immediate effects caused by the race on the desert plants.

Long-term objectives are (1) to determine subsequent trend data, i.e., re-establishment of seedlings, both annuals and perennials, (2) to determine re-sprouting, recoverability and growth rates, and (3) to provide vegetation condition trend data for relating to wildlife population trends.

Data requirements for these long-term objectives will include plant population and composition information; information concerning invasions by exotic plants; and comparison data from undisturbed areas.

2. Methodology

The vegetation analysis is based on photographs taken at a series of Environmental Sample Photo (ESP) Plots before and after the race. Base line photographs were taken November 11-15, 1974 and the post race set, December 9-13, 1974.

As previously described, the ESP photos consisted of a 360 degree series of colored photographs taken with a 35mm camera, 4.5 feet off the ground on a levelled tripod with a panoramic head. Plot selection was based on many different resource factors. For vegetation sampling, at least one representative site was established in each of the 13 vegetation sub-types with further stratification by vegetation

density, soil types and topographic aspect. Twenty-six ESP sites were photographed. Follow-up photographs and measurements will be necessary this spring and fall, 1975, to document re-establishment of annuals and growth rates of the perennial vegetation.

Of the 26 ESP sites, 10 are valid in determining effects on vegetation. The other 16 sites were: (1) missed by the race and received no use; (2) located along existing roads with no vegetation; (3) located on bare playa areas with no perennial vegetation.

Comparison plots on adjacent undisturbed areas may be necessary to depict what the natural vegetation was before any racing disturbance took place. The total effect of the damage to the vegetation due to race participants and spectators from the 1974 race is difficult to assess because of damage caused by races in preceding years.

The following information can be developed from the ESP sites:

1. Species of perennial plants.
2. Various degrees of vegetation damage, i.e., removed, completely crushed, partly crushed and burned plants can be tabulated.
3. Size of vegetation.
4. Species of annual plants with some ground truthing.
5. Number of plants per plot.
6. Plant spacing.
7. Growth rates, resprouting, establishment of new plants.

3. Findings

The following is a site by site review of the ESP findings:

ESP # 1 - West and behind of the start area (a creosote bush association). Impact was slight. Four out of 27 plants within the plot were damaged.

ESP # 2 - Start area for 2nd wave (a creosote bush association). 30 out of 146 plants on the plot were damaged. One creosote plant from about 300 feet south of the plot was aged to determine productivity of the area. The ring count averaged 29 rings per inch indicating a moderate growth site.

ESP # 3 - Southeast of start area. Racers missed this plot. No vegetation damage.

ESP # 4 - Crucifixion Thorn area. Some motorcycle tracks came right through the plot, rather than around it as planned. Some Mormon Tea in the vicinity of the plot was heavily crushed, however, it looks as though the plants will probably resprout.

ESP # 5 - West of West Cronese Lake on an up slope. Some tracks crossed this site. The vegetation in this area was already sparse and consequently very little of it appears hit. The creosote bushes that were hit appear to be only damaged and may resprout.

ESP # 6 - West of West Cronese Lake on a down slope (a creosote bush association). 1 plant out of 28 was damaged. Area had large rocks along with the shrubs that tended to concentrate the riders between the plants.

ESP # 7 - West edge of West Cronese Lake. Racers missed the plot. No vegetation damage.

ESP # 8 - North Edge of East Cronese Lake. Alkali sink area with dense 18 inch high shrubs. Racers concentrated to a 15 foot wide course with only a few participants outside the area. 48 out of 181 plants were damaged. The area of influence was increased in this area.

ESP # 9 - East of mouth of Afton Canyon. Racers stayed on designated road. No vegetation damage.

ESP #10 - East of Rasor Pits. Course missed plot. The little vegetation present was undamaged.

ESP #11 - West shoreline of Soda Lake (sand humock). Damage to perennial vegetation was difficult to measure because of the density of plants in mesquite thickets. Annual seedlings were absent in the fresh motorcycle tracks, however they are numerous away from the track.

ESP #12 - Narrow wash. Just prior to the plot, several bushes about 2 feet tall and as broad, have been hit directly. Of these the stink weed and ephedra have been uprooted. No impact on vegetation occured within the plot.

ESP #13 - Turquoise Mtn. Road crossing - Cheesebush Wash. 3 out of 103 plants were damaged. Annual seedlings had been eliminated in the motorcycle tracks. Large brush, up to 10 feet tall, tended to concentrate vehicles between them.

ESP #14 & 15 - Bull Spring Wash Road. Racers did not stray from designated road. No vegetation damage.

ESP #16 - Valley Wells Pit Stop. Course and pit area missed plot. No vegetation damage.

ESP #17 - Shadow Valley Wash (acacia-rabbitbrush association). This was a wide, desert wash and the majority of the racers missed where the plot was established. No vegetation damage occured.

ESP #18 - East of Shadow Valley Road crossing. Wash area. Racers crossed areas of the wash where vegetation did not occur.

ESP #19 - Keany Pass Dirt Road. Racers stayed on designated road. No vegetation present.

ESP #20 - State Line Pits. Lake Playa - no vegetation present.

ESP #21 - Roach Lake. 2 plants out of 65 on the plot were damaged.

ESP #22 - West of Beer Bottle Pass. Course confined to narrow wash. 1 plant out of 114 along the wash within the plot was damaged.

ESP #23 - East of Beer Bottle Pass. Racers stayed in wash area. No vegetation was present.

ESP #24 - Jean Lake. Last year's Russian thistle litter crushed and dispersed.

ESP #25 - West of finish (Open creosote - up to 18 inches high). 2 out of 176 plants damaged.

ESP #26 - Finish area (creosote type). 130 out of 170 plants damaged. Impact on area was so severe it took over one-half hour to relocate ESP plot center post.

Initial summary findings:

- Heavy impact on vegetation in parking areas.

- Large shrubs tended to concentrate racers between them.
- Seedlings that had germinated before the disturbance were eliminated, in the area of impact or tracking.
- Confinement of racers to existing roads, trails, barren washes and playa has the least impact on vegetation.
- Small plants are more susceptible to damage than large plants.

Vegetation plot analysis should be repeated during the spring and again in the later summer or winter months to determine site recoverability and impact on annual vegetation.

Plots 1, 2, 8, 11, 11A, 13, 21, 22, 25 and 26 need to be sampled during annual flowering time, Spring 1975. Other plots should be checked for effects on annual vegetation.

* Not counted, as vehicle caused no vegetation damage or plot was outside of course area

IMPACT ON VEGETATION AT E.S.P. PLOTS
WITHIN 50 FOOT RADIUS VIEW

ESP Plot #	Plant Association	Topographic Configuration	Total Perennial Plants/Plot	Total Damaged or Removed Plants	% Plants Damaged or Removed	Remarks
1	Creosote bush	Low sandy hill	27	4	15%	
2	Creosote bush	Bajada - gentle slope	146	30	20%	Start area - 2nd wave only - new area
3	Cheese bush	Wash	*	0	0	Course missed plot
4	Crucifixion thorn	Playa	*	0	0	Outside of main race course
5	Creosote bush	Bajada - gentle up slope	*	0	0	To side of course
6	Creosote bush	Bajada - gentle down slope	28	1	4%	In center of course
7	Alkali sink	Playa	*	0	0	Plot on previous year's course only
8	Alkali sink	Playa	181	48	27%	Dense 18" high shrubs - new area
9	Desert willow	Wash/road	*	0	0	Little vegetation on rough road
10	Creosote bush	Gentle down slope	*	0	0	Course mostly missed plot because of overextending of pit area
11	Alkali sink w/ Mesquite	Sand humock		1	?	Almost impossible to count because of mesquite thicket
11A	Creosote bush	Bajada - steeper up slope	54	11	20%	100 feet from playa
12	Desert almond	Wash	*	0	0	Narrow wash
13	Cheese bush	Wash	103	3	3%	
14	Joshua tree, Mojave yucca, cactus	Up slope road	*	0	0	Stayed on road
15	Joshua tree, Mojave yucca, cactus	Up slope road	*	0	0	Stayed on road
16	Creosote bush	Flats	*	0	0	Course and pit missed plot
17	Acacia - Black-banded rabbit brush	Wash	*	1	0	Missed plot
18	Creosote bush	Wash	*	0	0	Confined to narrow wash
19	Black brush - yucca	Road	*	0	0	Stayed on road
20	Alkali sink - bare	Playa	*	0	0	No vegetation
21	Alkali sink - lake edge	Playa	65	2	3%	Course 25' wide
22	Joshua tree, Mojave yucca, cactus	Wash	114	1	1%	Confined to narrow wash
23	Creosote bush	Down slope - bajada & wash	*	0	0	Confined to two washes
24	Alkali sink - lake	Playa	*	0	0	Crushed Russian thistle litter
25	Creosote bush	Gentle side slope	176	2	1%	
26	Creosote bush	Flats	170	130	76%	Heavy use, parking area

C. Impact on Wildlife

1. Objective

The E.I.S. predicted two basic types of impacts on wildlife populations from the motorcycle event and related vehicle use. First, there would be losses to the animal population at the time of the event due to direct mortality; and second, there would be long-term losses from degradation and destruction of wildlife habitat. To test these predictions, a study was designed with the following objectives:

a. To determine immediate changes in small mammal populations resulting from the race.

b. To determine the long-term effects on habitat modifications on small mammal populations.

2. Methodology

Two study sites were chosen in the vicinity of the start of the Barstow-Las Vegas Race. These sites are located approximately 11.5 miles north and 22.5 miles east of Barstow, San Bernardino County, elevation 1,960 feet (T. 11 N., R. 3 E., Sec. 24). The marker for Environmental Sampling Plot No. 2 (ESP) was in the northeast corner of Study Site I. Study Site II was immediately south and adjacent to Site I. The two plots covered 7.4 acres (3 hectares).

Study Sites I and II contained two basic habitat types; one type, a small rise of wind-blown sand, has a vegetative cover of creosote bush (Larrea tridentata) galleta grass (Hilaria rigida), some burrobush (Ambrosia dumosa), and the skeletons of at least two species of evening primose (Camissonia clavaeformis, Oenothera deltoides). The second habitat type, on the flats, was predominantly of burrobush-

creosote bush, with a trace of turtleback (Psathyrotes ramosissima) and desert straw (Stephanomeria pauciflora).

Both study sites had been on the course of previous Barstow-Las Vegas Races. It is not known how many years the course traversed the two study sites. Vehicle tracks were evident throughout both plots and there were numerous dead shrubs. There was evidence of loss of several species, such as cheese bush (Hymenoclea salsola), Nevada joint fir (Ephedra Nevadensis), white ratany (Krameria Grayi), and Anderson thornbush (Lycium Andersoni), both from the litter and from lesser disturbed sites in the vicinity. Therefore, it can be assumed that the study plots had sustained some damage to vegetation and to the soil mantle prior to the race, the extent of which was unknown.

There are several species of small mammals that should occur at the site. The following list of probable species is based upon literature reviews, distributional maps, habitat preferences, and previous trapping experience (Hall and Kelson, 1959; Berry pers. commun.; Lester, pers. commun.):

Round-tailed ground squirrel	Spermophilus tereticaudus
Antelope ground squirrel	Ammospermophilus leucurus
Desert Kangaroo rat	Dipodomys deserti
Merriam Kangaroo rat	Dipodomys merriami
Long-tailed pocket mouse	Perognathus formosus
Little pocket mouse	Perognathus longimembris
Canyon mouse	Peromyscus crinitus
Deer mouse	Peromyscus manicultatus
Grasshopper mouse	Onychomys torridus

There are other species that may also occur, but their presence is unlikely:

Desert woodrat	Neotoma lepida
Mojave ground squirrel	Spermophilus mojavensis

The wood rat requires either extensive piles of litter and/or rocks. The geographic range of the Mojave ground squirrel is not well defined. The nearest localities occur at least 30 miles to the west.

Pre-race trapping consisted of five hundred Sherman live traps placed in 10 lines of 50 traps each at Site I for three consecutive days from November 21 through November 23, for a total of 1,500 trap nights. Traps were set 6 yards apart. All traps were then moved to the adjoining Site II, again placed in 10 lines of 50 traps each for 3 nights, from November 24 through November 26, for a total of 1,500 trap nights. Pre-race trapping totalled 3,000 trap nights.

Traps were baited with rolled oats and were set each evening and checked each morning. All captured animals were toe clipped and released. The trap site for each capture was noted.

The Barstow-Las Vegas motorcycle event occurred on November 30th. However, participants began to arrive about November 26, and remained at least through December 1.

The post-race trapping began on December 7 at Site I and continued through December 9. Traps were moved to Site II on December 9 and set for 3 consecutive nights through December 12. Each site was trapped in the same manner as described for the pre-race trapping, for a total of 3,000 trap nights for the two sites. All animals captured

during post race trapping were killed and frozen for verifying their identification.

3. Findings

The pre-race trapping results for Sites I and II were combined because the two formed a single plot. Thirty small mammals were captured from 3,000 trap nights, a trapping success of 1%. Three species were taken: 18 Merriam Kangaroo rats, 10 desert kangaroo rats and 2 Antelope ground squirrels (Table I). All the desert kangaroo rats were captured in blow-sand.

The kangaroo rats were apparently not trap-shy. During the 6 day pre-race trapping, many of the marked animals were recaptured. There were 8 recaptures of desert kangaroo rats, and 19 of the Merriam kangaroo rats. Some animals were retrapped more than once. It is possible that all or almost all the kangaroo rats at Site I were captured; no new animals were taken on the third day. At Site II, only 3 new animals were taken on the final day.

The numbers of animals and the species composition of the pre-race trapping was not as expected in the 7.4 acre plot. Only three species were captured out of a possible 9. Such species as the round-tailed ground squirrel, although observed several hundred yards away in similar, but relatively undisturbed habitat, were not taken. Neither the long-tailed pocket mouse nor the little pocket mouse were captured. The canyon mouse and grasshopper mouse would be expected in low densities. Rocks were present, which is a requirement for the canyon mouse. The grasshopper mouse is widespread in distribution and occurs in most habitats; however, it can be a difficult species to

catch. Deer mice are also ubiquitous; however, densities are dependent upon forage availability and moisture levels.

The low pre-race capture success may be the result of two factors: the season; and the disturbed habitat condition. Some rodents, such as the pocket mice (Perognathus) are not as active above ground during early winter as in spring, summer and fall. Also, numbers of all small mammal species tend to be declining during this period. Thus, the winter conditions could have been partially responsible for the initial low pre-race trapping success.

The second factor, disturbed habitat conditions, is probably more important. Byrne (1973) in trapping identical habitats with different degrees of vehicular disturbance in the Mojave Desert, found reduced numbers of small mammals and lowered species diversity in areas with moderate to heavy vehicular use. Trapping Sites I and II have been disturbed by previous Barstow-Las Vegas races and vegetative cover and diversity for these sites was lower than in similar undisturbed areas in the vicinity. The percentage of vegetative loss prior to the 1974 race is not known.

The total catch during the post-race trapping included 3 species (Table C-2). At Site I, one desert kangaroo rat was recaptured, and a new species, the grasshopper mouse, was captured. At Site II, part of one carcass of a Merriam Kangaroo rat was taken.

Trapping success after the race was 0.1%. The marked reduction in trapping success after the race could be due to two factors: the pre-race captured animals had become "trap-shy"; and a combination of direct mortality and habitat loss. The "trap-shy" probability is considered to be minimal, as the recapture rate for both

sites prior to the race was very high. Therefore, losses except for one desert kangaroo rat killed during pre-race trapping, can be considered the result of direct mortality and habitat destruction.

During pre-race and post-race trapping various parts of animals were found in the traps. These were tail tips, parts of tails and parts of hind legs. Because of the size of the animals being trapped this often happens. To reduce the possibility of bias, these body parts were not included as animals captured.

In summary, there were 30 marked individuals on the study plots prior to the race. The total number of animals for post-race trapping was 3, a reduction of 90% in the take (Table C-2). Only one marked rodent, a desert kangaroo rat, was recaptured after the race. One new individual, Merriam Kangaroo rat, and a new species, the carnivorous grasshopper mouse, were also captured.

To complete the second objective of this study, continuing studies will be conducted. This will involve retrapping the same study area in late October 1975. Comparable trapping will be done on an adjacent, similar, undisturbed habitat type. These data will be used to determine to what extent the small mammal populations have recovered on the race course and to determine to what extent the race course study plot had been impacted prior to the 1974 race.

PRE-RACE TRAPPING

SITE I

Species	Date	Number of Animals New	Recaptured	Total
	11/21			
Desert Kangaroo Rat		4		4
Merriam Kangaroo Rat		4		4
	11/22			
Desert Kangaroo Rat		5[1]	4	9
Merriam Kangaroo Rat		6	4	9
	11/23			
Desert Kangaroo Rat			3	3
Merriam Kangaroo Rat			6	6
TOTALS		19	17	

SITE II

	11/24			
Merriam Kangaroo Rat		4	4[2]	8
	11/25			
Merriam Kangaroo Rat		2	2	2
Antelope ground squirrel		2		2
	11/26			
Merriam Kangaroo Rat		2	3	5
Desert Kangaroo Rat		1	1	2
TOTALS		11	10	

Total Individuals marked at Sites I and II: 30

10 Desert Kangaroo rats
2 Antelope ground squirrels
18 Merriams Kangaroo Rats

1. One desert kangaroo rat had a broken hind leg and was killed.

2. All recaptured from Site I; one was dead in the trap.

TABLE IV - C-2

POST-RACE TRAPPING

SITE I

Date	Species	Number of Animals New	Recaptured
12/7	Desert Kangaroo rat		1
	Grasshopper mouse	1	
12/8	No takes		
12/9	No takes	____	____
	TOTAL SITE I	1	1

SITE II

12/10	Merriam Kangaroo rat	Part of carcass	
12/11	No takes		
12/12	No takes	____	____
	TOTAL SITE II	1	0

Total individuals taken at Sites I and II: 3

D. Impact on Cultural Resources

1. Objectives

The objective of the cultural resource analysis was to determine the impact of the race on archaeological sites revealed in pre-race surveys.

2. Methodology

The entire area of the race's potential environmental impact was initially asessed for previously known cultural values, followed by intensive surveys of the route to reveal unrecorded cultural values.

Survey results revealed that 50 recorded archaeological sites and three historic sites were located within three miles of the race course. One site, Pachalka Spring, was located in the course as originally laid out. A course modification removed any possible impact of this site.

The site listed in Table IV-D-1 as the "unnumbered site", was within an area where the racers did not converge as soon as expected. Consequently, pre-race mitigation measures had not been developed.

Of the identified sites, only ten were within the impact zone of the race. Of those, it was judged that three sites (BV-2, 3, and 4) would sustain impact.

Ten archaeological sites or concentrations of sites were evaluated by National Register criteria in the Barstow to Las Vegas EIS for the race. These include: (1) BV-1; (2) BV-2, 3, and 4; (3) East Cronese Lake; (4) BV-5; (5) BV-6; (6) BV-7; (7) Pachalka Spring; (8) BV-8; (9) Old Government Road, and (10) Tonopah and Tidewater Railroad.

The proposed mitigation was established to ensure that no significant further damage to the identified cultural values would occur. Mitigation measures for the archaeological values consisted of flagging and marking the race course along with placement of course marshals and BLM personnel to channel the race participants.

Base line studies on damage from prior races was assessed to allow for better assessment of damage from the 1974 race.

3. Findings

Site by site measures of damage are presented in the following text and are summarized in Table IV-D-1. A review of these findings is as follows:

BV-1

The only apparent disturbance was approximately 25 vehicle tracks, representing an increase of less than five percent disturbance from prior to the race.

UNNUMBERED SITE

This site near BV-1 was not observed prior to the race, nor had it been previously recorded. The extent of previous disturbance is unknown. It is estimated that between 50 and 75% of this quarry workshop site is now disturbed or destroyed. Most of the racers ran through this site in a wide swath.

CRUCIFIXION THORN SITE

This site consisted of five loci of culturally modified materials. Two or three motorcycle tracks were observed passing through one loci. Other vehicle tracks were found along the periphery, but not impacting cultural resources.

BV-2

Previous races cut several trails through this site. It is estimated that one to two percent of the site may have received new disturbance.

BV-3

The main existing bike trails through this site were widened and several new trails established, resulting in an estimated increase in disturbance to the site surface of ten percent.

BV-4

This small site sustained an estimated 10% disturbance as a result of the establishment of several new trails and widening of existing trails through the site.

WEST CRONESE SITE

Mitigation efforts were not successful in keeping racers off the site since the original site boundaries were inadequately determined during pre-race survey. Five or six main trails, half of which were established during previous races (each averaging eight to ten feet in width), and scattered single bike tracks were cut through the site. It is estimated that 10% to 15% of the site surface was disturbed due to this race.

SBr-248

Little new disturbance to this scatter of cultural materials can be attributed to the race activity, although several ORV tracks possibly associated with post-race activity were observed.

SBr-247

No motorcycle or other off-road vehicle tracks were observed at this site during post-race field examination.

SBr-246

No new disturbance attributable to race events was apparent.

SBr-129

Mitigation efforts were almost entirely successful by limiting disturbance to this small site to one set of 4-wheel vehicle tracks.

BV-5

This scattered site located in mesquite dunes and sand hummocks adjoining soda playa had an increase in surface disturbance estimated at approximately 20% of its surface.

TONOPAH-TIDEWATER RAILROAD GRADE

The mitigation measure at the Tonopah-Tidewater Railroad Grade was to keep the racers within a 15-foot wide course across the berm. This was accomplished, except that within the 15-foot wide course a 2 to 3 foot deep trench was cut through the berm. The E.I.S. did not anticipate this impact. A road is present along the top of the berm and tracks show that some vehicles moved on and off the sides, possibly impacting cultural materials in the vicinity as well as the berm itself. It is not known if these tracks were made by anyone associated with the race.

OLD GOVERNMENT ROAD (MOJAVE ROAD)

No estimates of impact to this historical road can be made as its location in the vicinity of the race course has not been defintely determined.

BV-6

The race bypassed this previously collected archaeological site. No new disturbance was observed.

BV-7

Mitigation efforts were successful in keeping racers to the existing trail through this scatter of cultural remains resulting in no increase in site disturbance.

SCBM-1068

This site received no race-related impact due to mitigation.

IVANPAH SITE

Existing records indicate a site is present near Ivanpah Lake along the race course. However, cultural remnants were not found during the pre-race survey. Therefore, no assessment of damage to cultural remains is possible.

BV-8

This small, previously disturbed lithic scatter is located near the finish and apparently received no new impact as a result of the race.

Measures devised for the protection of cultural resources along the Barstow-Las Vegas Motorcycle Race in general proved less effective than anticipated. Table IV-D-1 illustrates the amount of increased disturbance and the relative degree of mitigative effectiveness at each site. Implications of the impact on cultural sites, in spite of mitigation measures, are significant. Reference to Table IV-D-1 indicates that of 19 sites investigated as a result of mitigation measures, three sustained 15% or greater disturbance. Four sustained 6 to 15% disturbance, and the remainder sustained 5% or less disturbance. Significantly, however, only four of the 19 sites have sustained less than 10% damage, from this and apparent previous races. Special concern should be noted in respect to the four sites evaluated in the E.I.S. as eligible for the National Register of Historic Places.

Heavy impact, defined as level 2, 11 to 25% disturbance, has occurred on two sites eligible for inclusion on the National Register as portions of a District (Cronese Lake and Site BV-5).

Two historic sites eligible for the National Register are the Tonopah-Tidewater Railroad Grade and Mojave Road (Old Government Road). Impact on these values is difficult to assess. However, the cutting of a 2 to 3 foot trench through the berm of the Tonopah-Tidewater Railroad Grade was significant.

Table IV-D-1

	Previous Disturb.	% Prev. Disturb*.	% Disturb. of the Race*	Relative Mitigative Effectiveness **
BV-1 - Mill Site (Alvord Mt.)	+	2	2	H
Unnumbered Site (Alvord Mt.)	?	?	4	L
Crucifixion Thorn Site (Cave Mt.)	+	1	1	M
BV-2 (Cave Mt.)	+	2	2	H
BV-3 (Cave Mt.)	+	2	3	M
BV-4 (Cave Mt.)	+	2	2	M
West Cronese (Cave Mt.)	+	1	2	L
SBr-248 (Cave Mt.)	+	2	2	H
SBr-247 (Cave Mt.)	+	2	2	H
SBr-246 (Cave Mt.)	+	1	1	H
SBr-129 (Cave Mt.)	?	1	1	H
BV-5 (Soda Lake)	+	2	3	L
Tonopah-Tidewater Berm (Soda Lake)	+	2	2	M
Mojave Road (Soda Lake)	?	?	?	?
BV-6 (Soda Lake)	+	5	5	H
BV-7 (Soda Lake)	+	2	2	H
SCBM-1068 (Valley Wells)(Mescal Range)	+	1	1	H
Ivanpah Site (Roach Lake)	+	?	?	?
BV-8 (Sloan)	+	4	4	H

19 Sites

* Relative Scale of Disturbance
- 1 = 0- 10%
- 2 = 11- 25%
- 3 = 26- 50%
- 4 = 51- 75%
- 5 = 76-100%

** Relative Scale for Mitigation Effectiveness

Low = over 15% disturbance
Medium = 6-15% disturbance
High = 5% or less disturbance

E. Outdoor Recreation Analysis

1. Objectives

The purpose of monitoring the recreational aspects of the race was to determine the validity of pre-race assumptions regarding the numbers of participants and spectators, their activities and conflicts.

2. Methodology

Counts were made from aerial photographs and people were interviewed at the start of the race, the pits, and the finish area.

Numbers of spectators, crews, and riders were estimated by counting vehicles on aerial photographs made at selected points along the race route. Vehicles counted were multipled by 2.8 people/vehicle. Cycles were not included in the vehicle count, only trucks, vans, automobiles, and similar rigs used for transportation to and from the area. The 2.8 people/vehicle multiplier was derived from interviews. The interviews were taken randomly and were structured on a single-page questionnaire. See Appendix 4 for the form used.

3. Findings

a. Counts

Table IV-E-1 shows the results of counts derived from the aerial photos and compares figures with the EIS estimates.

The aerial photo calculations were below the estimates in the EIS. It is recognized that in oblique photos some vehicles could

be obscured by others. Also, some vehicles on the freeway between pit stops or the finish area could have been missed. The spectator count at the time of the start was more accurate because it was based upon photos taken just before the start. Ground observers estimated there was about one spectator for each rider at the start line.

Aerial photos at Rasor pits were taken at the height of the activity. Therefore, no influx of people from the start area was expected to increase the numbers recorded at this pit. Numbers at Rasor pit are normally expected to be higher than at any other pit because many riders go no farther.

It has been reported that a large exodus of spectators or crew left the start area beginning at 6:30 a.m. These vehicles could have been counted at Rasor Pits in the 9:00 a.m. photos, or at Valley Wells at 10:30 a.m., or Stateline Pits at 11:00 a.m., or at the finish at 12:00 a.m. There is no way of knowing how many were actually on the road when the aerial photos were taken.

The interviews revealed that many racers had a family supporting them. Parents might be pitting at Rasor, a brother at the start, and another brother at Valley Wells. Each of the brothers might also have a vehicle. Therefore, the total number of people per vehicle may be rather low and the 2.8 vehicle factor is questionable.

The population of 932 persons estimated at the finish area is an underestimation. Spectators arrived and left

throughout the day to pick up finishing riders. No tabulation of the total magnitude of persons or vehicles at the finish area was made. However, two counts were taken of vehicles passing through the intersection of Blue Diamond-Pahrump Road toward the finish site. At 1:00 p.m. the count indicated that 13 cars per minute were entering the area and at 3:00 p.m. twenty cars per minute were entering the area. It is unknown just how many of these vehicles actually stopped at the finish area. These counts do indicate that the height of activity at the finish was at about 3:00 p.m. Bureau observers indicated activity remained heavy until about 6:30 p.m.

There was an unanticipated congregation of 372 spectators or crew at the Kelbaker Road crossing. This congregation either went unnoticed at earlier years' races or occurred this year for the first time.

Adding the counts at all the pits, the start, and the finish, 3,247 vehicles were counted. This times 2.8 persons/vehicle adds to 9,092 spectators, crew, and racers counted. In the EIS the spectators and crew were considered separately from racers, therefore, 3,000 racers should be subtracted from the 9,092, for a total of 6,092 spectators and crew. This is compared to the EIS estimated 13,000 to 15,000. Again, no one knows how many race related vehicles were along the interstate highway at the time of photographic sampling and this report's estimate could be too low.

In summary, the population figures for the 1974 race were measured by aerial photos and spectator interviews at the start, pits, and finish areas. The EIS population projections were based upon recollection. The calculated 6,092 race spectators and crew for the entire 1974 race was 6,908 less than the estimate in the EIS. At starting time in the start area, there were 3,623 persons, or 6,377 less than the EIS estimate. Also, aerial photos at an oblique angle could have obscured some vehicles that should have been counted; there were race-associated vehicles enroute on freeways that were missed; and estimates at the finish are admittedly low because the crowd fluctuated. Valid conclusions cannot be based on these counts.

THE POPULATION OF SPECTATORS, SUPPORT CREWS AND RIDERS
AT THE 1974 BARSTOW-VEGAS MOTORCYCLE RACE *

Area	Time of Sample Aerial Photos	Number of Vehicles	Population Estimate @2.8 persons/vehicles **	E.I.S. Population Estimate	Difference From EIS Estimates	Remarks
Staging & Start Camping Area	8:00 am	1294	3623	10,000 to 12,000 at time of start	-6377 at least	The number here for the weekend was undetermined
Razor Stop	9:00 am	584	1635	6,000	-4365	
Kel Baker Road Crossing	10:00 am	133	372	None was Anticipated	--	
Valley Wells Stop	10:30 am	460	1288	4,000	-2712	
Stateline Stop	11:00 am	433	1240	4,000	-2760	
Finish	12:00 am	333	932	10,000	-9068	
TOTAL		3247	9092	13,000 to 15,000	-3908 at least	

* Based upon aerial photo counts

** 2.8 person/vehicle was derived from interviews at the start, pits and finish areas. This figure includes the motorcycle racers.

b. Interviews

One hundred and ninety-eight interviews (Table IV-E-2) yielded the following data:

VEHICLES - Of those interviewed, 31% came in pickups, while 42% came campers, motor homes, and vans.

ADDITIONAL EQUIPMENT - 72% of the interviewees brought along motorcyles, and 4% brought dune buggies.

VEHICLE OCCUPANTS - Of those recreationists interviewed, 20% of the vehicle occupants were children, and 36% were females.

ORIGIN - 75% were from southern California. 10% were from Nevada.

LENGTH OF STAY - Of those interviewed, 50% stayed one night.

ACTIVITIES ENGAGED IN - 33% of the interviewees were spectators, 21% participants, and 5% crew members.

TOTAL VISITS/YEAR TO DESERT - The survey results indicated that of those interviewed, approximately 62% visited the desert less than 20 times a year.

ON OTHER VISITS - OTHER ACTIVITIES PARTICIPATED IN - Results from the survey indicated camping (23%) and recreational cycling (25%) were the two most popular activities when the interviewees had visited the desert on other occasions. For the interviewees, 3% were interested in sightseeing.

The EIS assumed many recreation activities occurred simultaneously in the same area as the proposed race (page II-56) and that these activities included wilderness experience, backpacking and hiking, nature study, rockhounding, land sailing, glider flying, model plane flying, model rocket launching, hunting, shooting, driving for pleasure, recreation vehicle use, photography, painting, camping, and picnicking.

The EIS also assumed possible conflicts between such users and those users associated with the race (Table III C-3, page III 48-56, page V-14).

The data in this report are inconclusive regarding such possible conflicts. We have no counts or interviews of other users. Thus, no comparisons or correlations could be made to support or deny the validity of the assumptions in the EIS.

The interview study was not adequate to evaluate personal benefits (psychological, physiological, social, etc.) of race-associated users or other users. The study in this instance was not designed in an adequate scientific manner sensitive to human needs as well as resource capabilities. Safety factors in the race also need detailed study.

The Bureau will conduct a scientific study in the California Desert regarding competitive motorcycle events. The study will include (1) counts of all classes of recreation users associated

with events or in the area of events, (2) evaluation of needs, motivations, and benefits of each class of user, (3) evaluation of user conflicts, and (4) evaluation of safety factors.

Vehicle

Car	32
Pickup	65
Camper	40
Motorhome	25
4 WD	15
Cycle	5
Van	16
Self-contained	11

Additional Equipment

Dune Buggy	5
4 WD	4
Cycle	84
ATV	0
Trailer	19
Other	4

Vehicle Occupants

Adults	447	
Children	118	
Males		358
Females		207
TOTAL	565	

Origin

Local	7
So. Calif.	117
Other Calif.	6
Nevada (Las Vegas)	16
Other out of State	10

Length of Stay

1 night	79
2 nights	45
3 nights	9
Other	23

Activities Engaged In

Crew	9
Spectator	53
Participant	34
Camping	33
Fun ORVing	17
Other	12

Total visits/year to Desert

0 - 5	44
5 - 10	17
10 - 20	37
20 - 30	32
30 - 40	4
40+	22

*Group Type

Family	60
Friends	22
Alone	6

Expenditures

$ 0	14
0 - 10	24
10 - 20	35
20 - 30	27
30 - 40	14
40 - 50	17
50 - 75	15
75 -100	3
100+	7

On other visits - other activities participated in

Camping	44
Dirt Racing	8
Rockhounding	9
Rec. Cycling	49
Picnicking	19
Sightseeing	6
Hiking	7
Other	48

* Not included on some forms.

F. Surface Impact Analysis

1. Objectives

The E.I.S. estimated that previous competitive events along this course had influenced 7,505 acres of National Resource Lands. Also the EIS estimated that within this area of influence, 4,503 acres of surface were actually covered by tracks. This analysis attempts to more accurately measure and describe the area of influence and the tracked areas. Whereever possible, comparisons are made to the EIS estimate.

2. Methodology

As previously described, twenty six Environmental Sampling Photo Plots were established to monitor the impact of the race in various representative vegetative and soil association areas. Also, vertical 70mm color aerial photography was taken before and after the race. Black and white oblique aerial photos were taken at the start, finish and pit areas on race day.

The frequency of tracks was gauged by placing a dot grid over each "before" and "after" 35mm ESP transparency and counting "dots" which were on motorcycle tracks. This was done for each of the ten frames of each ESP plot.

The total area represented by each "dot" was based on the following assumptions:

a. The average area covered per dot

$$= \frac{701.44 \text{ sq. ft.}/\text{frame}}{39 \text{ dots/frame/50' radius}} = 17.98 \text{ sq. ft./dot}$$

b. The percentage of track covered ground area within the area of course influence is estimated at 40%. This figure is based upon ocular comparison and examination of the vertical aerial photos, ground (ESP) photos and field measurements. Therefore,

17.98 sq. ft. (average)/dot x 40% (average area covered with tracks) = 7.19 sq. ft. dot covered with tracks

c. The 40% figure is less than the "60% previously impacted area" slated in the EIS on page V-4. The EIS estimate was based upon less intensive field measurement and did not have the benefit of the 70mm vertical aerial photography. The 40% figure still necessarily must be an estimate as the diversity in course width and patterns of tracks is highly variable. A several fold increase in numbers of ESP plots and area of aerial coverage would be necessary to increase the accuracy of estimate.

d. The frequency of dot "hits" for the before and after photos is more accurate than the calculations of area coverage per dot ("b" above). However, area coverage is used as a constant so that quite accurate comparative calculations can be made.

e. Photo perspective will make "dots" away from the camera represent a larger area than those in the foreground.

This should not be too extreme as only the 50 foot radius area was used. They are assumed to average out each other.

3. Findings

a. Area of influence - The area of influence of the race course was increased by 1,632 acres over the area of previous races. This increase, from 5,265 to 6,897 acres, amounted to 31 percent more disturbance. The EIS anticipated no increase in the area of influence.

The increase in area of influence differed markedly on different soil associations and sections of the course. The "racers" did not converge within 3 miles after the start as anticipated, resulting in a 29.5 percent increase in soil association Ma. The widening in the first 6.5 miles of course likewise caused a relocation of the course route and an increase of area in soil association Cj and a decrease in soil association Ad. The steeper slopes of the Gr association apparently caused racers to slow, creating a bottleneck encouraging passing and a consequent course widening. The Rp association was curiously influenced less than anticipated. This result was because the riders didn't use much of the already tracked playas. The Du association being so small was apparently inadvertantly omitted in the EIS tabulations, so no "before" and "after" comparisons can be made.

The area of influence of the start, pits and finish areas increased from the EIS estimate of 2,240 to 2,529 acres, or 13%. This increase calculation is conservative as it is based upon the location of spectator and crew vehicles visible on oblique aerial photographs. It was a one time or point estimation. Pit riding accounted for a

greater, but undertermined area of influence. The areas were plotted on topographic maps from the 4x5 oblique aerial photos. The plotted areas were measured by planimeter. The areas at Valley Wells Pit Stop and the finish area were greatly over-estimated in the EIS.

SUMMARY OF INCREASED AREA OF INFLUENCE

Influenced Area	Soil Assn.	Acres in Area of Influence Before*	After	Percent Change	Remarks
Race course	Ac	590	763	+29	
Race course	Ad	1831	1149	-37	Realignment of the converging near the start resulted in less Ad and more Cj soil influenced.
Race course	Cj	90	478	+431	
Race course	Gr	110	333	+203	Riders passed each other here more than anticipated.
Race course	Ma	700	2767	+295	Riders didn't converge as soon as anticipated.
Race course	Rp	1944	1384	-29	This year's course didn't overlap all of past year's tracks.
Race course	Du	?	23	?	Inadvertently omitted in EIS estimates.
Race course subtotal	--	5265	6897	+31	Increase of 1632 acres or 2.55 square miles.
Staging area	Ma	810	1563	+93	
Rasor stop	Ac	110	340	+209	
Valley Wells stop	Ac	600	17	-970	EIS estimate included pit riding.
Stateline stop	Rp	80	280	+250	Pitting covered over one mi. more than planned.
Finish area	Ac	640	326	-49	Many racers in this area apparently used a different finish each time.
Kel Baker Road	Ac	?	3	?	An unanticipated spectator concentration.
Pit, Staging & Finish areas Subtotal	--	2240	2529	+13	Even though Valley Wells and finish area are considerably under EIS estimate an overall increase is noted.
TOTAL	--	7505	9426	+25	

* As estimated in the EIS

b. Tracked area - The area actually covered by the tire tracks within the area of influence as evidenced by before and after ESP plot calculations increased at least by 673 acres. The variances of increases at different soils, the variable number of ESP plots per soil association and the placement of some ESP plots on the side of the race course caused a possible underestimation.

It is impossible to compare EIS tracking figures with this analysis. The EIS figures for area of tracks were visually estimated in the field to average 60% of the area of influence. No details of variable percents by soil associations were given in the EIS or are they available. Data in this report is quantified by actual measurement instead of estimates and is therefore more defensible than the EIS data. The before environmental sampling photos and the aerial photos were not available at the time the EIS was written. Consequently, estimates for the EIS were difficult.

Increases in tracked area when summarized by some special topographic features yield the following data (See TABLE IV-F-3). In sandy areas the tracked area increased greatly because the soft soil ruts deeply, then the sides cave in. The tracks also widen as the bikes swerve with less control in sand. Wash areas also increase greatly in tracks per total area of influence because the course area of influence is narrow. In washes, 5 to 15 clusters of tracks are usually found as the larger size of bushes in a wash discourages creating of a "road". A similar phenomenon occurs on steep bajas, though not as great a magnitude of increase. The playa areas increased in tracks as the current course goes to the side of some of the existing tracks.

As anticipated, the increase in tracks where the course traverses dirt road is almost non-existent. The finish area ESP plot recorded the greatest increase in tracking. This tracking resulted primarily by vehicles of the spectators and crews.

INCREASE IN NUMBER & AREA OF TRACKS

Plot Area	ESP Plot #	Tracks Before *** #.	Area - acres ***	Tracks After *** #	Area - acres ***	Percent Increase	Soil Assn.	Remarks
Behind Start	1	17	.003	97	.016	667	Ma	
Start Area	2	0	0	289	.048	289	Ma	Not part of previous start areas.
Power Line road (missed course)	3	116	.019	135	.022	16	Ma	
Crucifixion thorn	4	8	.001	25	.004	212	Rp	
Bajada south of course	5	0	0	0	0	--	Ad	
Bajada	6	98	.016	111	.018	13	Ad	
West Cronese Dry Lake	7	--	--	--	--	--	Ad	Camera misaligned - a plot not on this year's course.
East Cronese Dry Lake	8	54	.009	93	.015	72	Rp	
Afton Canyon	9	231	.038	257	.042	11	Ac	
East of Rasor Pit	10	101	.017	198	.033	96	Ac	
South of Soda Springs	11	79	.013	303	.050	284	Ac	Very sandy soil.
East side Soda Lake	11A	150	.025	211	.035	41	Ac	
Cree Camp	12	41	.007	55	.009	34	Ac	
Turquoise Mtn. Road	13	62	.010	112	.018	81	Ac	
Bull Springs Wash Road	14	141	.023	158	.026	12	Gr	
Solomons Knob	15	209	.034	209	.034	0	Gr	
Valley Wells	16	0	0	0	0	0		Missed course.
Shadow Valley Wash	17	0	0	27	.004	27	Ac	
Shadow Valley road cross.	18	10	.002	43	.007	330	Ac	
Keany Pass	19	142	.023	142	.023	0	Gr	
Ivanpah Dry Lake	20	390	.064	390	.064	0	Rp	
Roach Lake	21	63	.010	130	.021	106	Rp	
Base of Beer Bottle Pass	22	1	0	10	.002	900	Gr	
Wash at Beer Bottle Pass	23	26	.004	40	.006	54	Ac	
Jean Lake	24	71	.012	149	.025	110	Rp	
3 miles to Finish	25	243	.040	287	.047	18	Ac	
Finish Area	26	41	.007	386	.064	841	Ac	
TOTALS		2294	.378	3857	.636	68		

* Tracks in those "frames" of ESP plots containing at least one track before or after the race

** Number of tracks = dot grid hits

*** Area = $\frac{(\text{\# dots}) \times (7.19 \text{ sq. ft./dot})}{43{,}560 \text{ sq. ft./acre}}$

TABLE IV - F-2

INCREASE IN NUMBER OF TRACKS

Type of Area	ESP Plot Ref.	# Tracks Before	Avrg. # Tracks Before	# Tracks After	Avrg. # Tracks After	Percent Increase	Remarks
Sandy	2	0	40	289	296	640	Tracks wider because sand spreads-also harder to control bikes in sand.
	11	79		303			
Playa	8	54	144	93	190	32	Bikes fan out to smoothest surface for speed and to pass - very large % of area already tracked.
	20	390		390			
	21	63		130			
	24	71		149			
Bajada-gentle slope	6	98	147	111	199	35	Bikes concentrated on a few tracks to avoid bushes.
	10	101		198			
	25	243		287			
Bajada-steeper slope	11A	150	64	211	92	44	As bikes are given more power for steeper slopes, digging & soil spreading increases.
	12	41		55			
	22	1		10			
Wash	3	62	24	112	55	129	Low absolute # of tracks-but less course widening because of confining sides of wash.
	17	0		27			
	18	10		43			
	23	26		40			
Dirt road	9	231	181	257	191	5	Roads offer least resistance at high speed-also, most of the roads are located after the half-way point where bikes are most spaced apart.
	14	209		209			
	15	141		158			
	19	142		142			
Finish area	26	41	41	386	386	841	Probably influenced by 4WD & camper vehicles as well as motorcycles.

TABLE IV - P-3

INCREASE IN TRACKED AREA
WITHIN AREA OF INFLUENCE OF COURSE

Soil Assn.	ESP #	% ESP acreage tracked ** Before	After	Avrg. % acreage tracked Before	After	Acres Influenced by course before race (from Fig. 1)	Acres covered with tracks before race	Acres Influenced by course after race (from Fig. I)	Acres covered with tracks after race	Change in area tracked before/after in acres	% Change
Ma	1	2	10	1	20	700	7***	2767	553	+446	6371
	2	0	30								
Rp	4	1	2								
	8	6	9								
	20	40	40	12	16	1944	233	1384	221	-12	-5
	21	13	13								
	24	16	16								
Cj	None Assumed similar to Ac			9 Assumed	18 Assumed	90	8	478	86	+78	+975
Ac	9	24	26								
	10	11	21								
	11	8	31								
	11A	16	22								
	12	4	6								
	13	6	11								
	17	0	2	9	18	590	53	763	137	+84	+158
	18	1	4								
	23	2	4								
	25	25	29								
	26	4	40								
Gr	14	14	16								
	15	21	21	12	13	110	13	333	43	+30	+231
	19	14	14								
	22	0	1								
Ad	6	10	11	10	11	1831	183	1149	126	-57	-31
Du	None Assumed similar to Ac			9	18	Missing	Missing	23	4	--	--
TOTALS						5265	497	6897	1170	+673	+135

* Estimates are based upon averages of ESP plots on different soils in TABLE IV-F-2 and upon acreages in TABLE IV-F-1. Only race course data are included - similar data for staging pit & finish areas was unavailable.

** Percent acreage tracked at ESP plot = area tracked per plot in acres / 0.16 acres/ESP plot

*** Underestimate - as plot 2 was only hit by second wave of racers.

TABLE IV - F-4

APPENDICES

1. Air Quality Analysis

2. Special Land Use Permit Stipulations

3. Summary of Injuries

4. Recreation Use Survey Form

5. Notes on 26 Environmental Sampling Photo Plots

6. Draft Report - San Bernardino County, California, Air Pollution Control District

AIR QUALITY

Air quality monitoring was provided through the cooperation of the San Bernardino County, California, Air Pollution Control District (SPCD) and the Clark County, Nevada SPCD. Clark County provided two high volume samplers and one tape sampler. San Bernardino County operated three high volume samplers, three AIS I tape samplers, thirty dustfall jars, and 10 carbon monoxide Dracyer tubes. Clark County provided data on 24-hour suspended particulate concentrations and visibility (hourly variations in percent transmission of light). San Bernardino County measured suspended particulate concentrations, visibility (coefficient of haze), dustfall (tons/square mile/30 days), and carbon monoxide concentrations.

Monitoring Results

Sta.	Location	Suspended Particulates -2*	-1*	Race*	+1*	Percent Increase in Dustfall
SB1	Campground	-	-	-	-	19%
SB2	Start	-	-	-	-	36%
SB3	1/2 mile E of Start	-	-	NS	NS	27%
SB4	2 miles E of Start	-	-	-	-	48%
SB5	Intersection w/I-15	-	-	-	-	55%
SB6	Opposite SB5	-	-	-	-	36%
SB7	Rasor Pit stop	-	-	176	180	22%
SB8	Valley Wells p.s.	-	-	-	-	NS
SB9	Valley Wells road	-	-	-	-	3%
SB10	Valley Wells, 1/2 mi. N I-15	-	-	158	94	9%
C1	Blue Diamond Road	23	29	97	57	NS
C2	Stateline rest stop	11	55	161	16	NS

* Two days preceding race (-2 and -1); day of race (Race); day after race (+1)

Suspended particulates were measured at 4 locations (SB 3 was inoperative). California standards are 100 ug/m^3, while Nevada and Federal secondary standards are 150 ug/m^3. Measurements indicate that California standards were exceeded at both California locations on the day of the race, and at one location on the day following the race (the other location approached the California standard on the day following the race). The data does not allow us to identify the contribution of the race to these suspended particulate levels. Nevada standards were exceeded at one location on the day of the race, but were not exceeded at the finish area. There was another ORV race in Nevada on the day of the Barstow-Las Vegas race, however, the Clark County SPCD does not feel that the measurements were affected by this other race. Bureau observers, however, noticed significant particulate emissions from the race, which passed within one-quarter mile of the Stateline station on four occasions. The conclusion in the EIS that suspended particulate standards would be exceeded has been verified by the monitoring results. The EIS overestimated the levels of concentration.

Visibility measurements were made on two tape monitoring devices. Average visibility was reduced by about 7 percent during the race. Visibility returned to normal within one day. Peak concentrations, as groups of riders passed the monitoring stations, were 3 to 5 times greater during the race.

Thirty days dustfall was measured at 10 locations along the race course in California. Background samples were taken at 5 locations. The overall impact of the Barstow-Las Vegas race (between the start area and the first pit stop) was to increase dustfall by about 30% for one month. Dustfall

was influenced by the concentration of vehicles at points along the course and other activities taking place in the vicinity of the stations.

Carbon monoxide levels were measured during the race. These levels did not approach the State standards. The conclusion in the EIS, that gaseous pollutant levels would be relatively insignificant, appears to have been verified.

The EIS attempted to correlate air quality impacts with soil association. The monitoring results are inconclusive in this area. Some locations are undergoing natural repair and others have returned to background levels. The areas where irreversible soil damage has occurred are subject to other, non-race related, influences.

San Bernardino County plans to publish a final report on the impacts of the Barstow-Las Vegas race in April, 1975. A draft of this report is contained in the Appendix.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 42-R0996

Serial Number
04-060-SL4-133

INSTRUCTIONS ON REVERSE

SPECIAL LAND-USE APPLICATION AND PERMIT APPLICATION

1. Name (first, middle initial, and last)
San Gabriel Valley Motor Cycle Club.
Attn Jim Bringhurst

Address (include zip code)
503 E. Payson
San Dimas Calif 91773

2. Give legal description of public lands for which you are applying

TOWNSHIP	RANGE	SECTION	SUBDIVISION
Linear Route from Manix Rd. To Las Vegas See attached Maps			

Meridian	State	County	Acres (number)
	Calif Nevada		

3. For how many years are you requesting this permit?

4a. Are you 21 years of age or over? ☑ Yes ☐ No

b. Are you a citizen of the United States or have you declared your intention? ☑ Yes ☐ No

c. As applicant, are you a ☐ Partnership ☐ Association ☑ Corporation; or an agency of ☐ Federal Government ☐ State Government ☐ Political subdivision of any state?

d. Are the statements required by Instruction Number 2 attached? ☐ Yes ☐ No ☑ Not applicable

5. Are you making this application for your own use and benefit? ☑ Yes ☐ No (If "no," explain)
District 37 Sanctioned event

6. Are the lands now improved, occupied, or used? ☐ Yes ☑ No (If "yes," describe improvements and purposes, identify users and occupants)
Vacant Public Lands

7a. What do you propose to use the lands for?
Cross Country Hare + Hound
Motorcycle Race

b. What improvements, including sanitation facilities, do you intend to make? (Describe improvements and attach drawings, if convenient)
Chemical Toilets at all Pit stops. (10 each)
Rescue + search units on course
1st. aid + Ambulance

c. What is the estimated cost of proposed improvement? $2500.00

d. What is the proposed source of water for domestic or other uses?
Entrants furnish own

8. Have you enclosed filing fee of $10? ☑ Yes ☐ No (See Instruction Number 3)

I CERTIFY That the information given by me in this application is true, complete, and correct to the best of my knowledge and belief and is given in good faith.

March 26, 1974
(Date)

San Gabriel Valley Motor cycle club.
James C Bringhurst
(Signature of Applicant)

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious, or fraudulent statements or representations as to any matter within its jurisdiction.

Form 2920-1 (January 1972)

PERMIT

Permission is hereby granted to The San Gabriel Valley Motorcycle Club

of Attn: Bob Miller
1529 Meadow Glen Way

to use the following-described lands: Hacienda Heights, CA 91745

TOWNSHIP	RANGE	SECTION	SUBDIVISION

See Attachment A

Meridian	State	County	Acres (number)
—	—	—	—

for the purpose of Hare & Hound - Point to Point Motorcycle event.

and subject to the following conditions:

1. This permit is issued for the period specified below. It is revocable for any breach of conditions hereof or at the discretion of the authorized officer of the Bureau of Land Management, at any time upon notice, if in his judgment the lands should be devoted to another use. This permit is subject to valid adverse claims heretofore or hereafter acquired.

2. Permittee shall pay XXXXXXXXXXXXXXX, to the authorized officer the sum of $1.00 per rider dollars as rental or such other sum as may be required if a rental adjustment is made.

3. Permittee shall observe all Federal, State, and local laws and regulations applicable to the premises and to erection or maintenance of signs or advertising displays including the regulations for the protection of game birds and game animals, and shall keep the premises in a neat, orderly, and sanitary condition.

4. Use or occupancy of land under this permit shall commence within 1 months from date hereof. XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

5. Permittee shall take all reasonable precautions to prevent and suppress forest, brush, and grass fire and prevent pollution of waters on or in the vicinity of the lands.

6. Authorized representatives of the Department of the Interior, other Federal agencies, and game wardens shall at all times have the right to enter the premises on official business.

7. Permittee shall not enclose roads or trails commonly in public use.

8. Permittee shall pay the United States for any damage to its property resulting from this use.

9. Permittee shall notify the authorized officer of address change immediately.

10. This permit is subject to all applicable provisions of the regulations (43 CFR 2920) which are made a part hereof.

11. Permittee agrees to have the serial number of this permit marked or painted on each advertising display erected or maintained under the authority of such permit.

12. Permittee shall not cut any timber on the lands without prior permission from the authorized officer.

13. This permit is subject to the provisions of Executive Order No. 11246 of September 24, 1965, as amended, which sets forth the Equal Opportunity clauses. A copy of this order may be obtained from the signing officer.

14. This permit may not be assigned without prior approval of the authorized officer of the Bureau of Land Management.

15. Special Conditions:

See Attachments A, B, C & D

A - Course Maps & Site Specific Mitigation Key (11 Maps)
B - Special Conditions
C - Site Specific Mitigation
D - Diagrams of Start, Pit Stops and Finish areas.

Permit issued for period

From November 27, 1974

To December 2, 1974

[signature]
(Authorized Officer)

Area Manager, East Desert (Title)

11/8/74 (Date)

INSTRUCTIONS

1. Submit, in *duplicate*, to any local office of the Bureau of Land Management having jurisdiction of the lands.

2. An application by a partnership or association must be accompanied by a statement by each member that he is a citizen of the United States or has filed a declaration to become a citizen. An application by a corporation must be accompanied by a statement showing that the corporation is authorized to hold land in the State in which the land is located and that the person making the application is authorized to act for the corporation.

3. If applicant is other than a Federal, State, or local governmental agency, this application must be accompanied by a nonreturnable filing fee of $10 made payable to the Bureau of Land Management.

4. If this application is for permission to erect an advertising display or sign, the applicant must: (a) attach an accurate and fully descriptive diagram, sketch, or photograph (at least 3" × 5") of the sign or display to be erected showing the dimensions, type of construction, estimated cost, the advertising material to be included thereon, the plan of illumination, if any, and the manner of attachment to the land; and, (b) a photograph (at least 3" × 5") showing the site on which the sign or display is to be erected.

☆ U.S. Government Printing Office:1973-784-° '2189 Region 6

SPECIAL CONDITIONS

(1) The permittee shall guarantee the faithful performance of all terms and and conditions of this permit, including the payment of the recreation use fees required. The guarantee shall be secured by an undertaking signed by two qualified members of the sponsoring club, and will be in the amount of $8,000.00. In addition, a notarized affidavit of qualification will be signed by each person signing the undertaking and will be presented to the District Manager, Riverside District Office, Bureau of Land Management, along with the undertaking.

The undertaking shall remain in force as long as necessary to insure compliance with all terms and conditions of their permit.

(2) The permittee shall indemnify, defend, and hold harmless the United States and/or its agencies and representatives against and from any and all demands, claims, or liabilities of every nature whatsoever including but not limited to damages to property, injuries to or death of persons, arising directly or indirectly from or in any way connected with, the permittee's use and occupancy of the lands described in this permit or with the event authorized under this permit.

(3) The permittee is required to maintain comprehensive liability insurance covering its operations under the permit, insuring the United States in the following minimum amounts:

(a) $100,000 for bodily injury to any one person and $300,000 for any one occurrence.

(b) $10,000 for property damage for any one occurrence.

(c) The insurer shall agree to give the United States 10 days' notice prior to cancellation or modification of such insurance.

(d) The permittee shall provide a copy of the actual insurance policy to the District Manager, who will forward it to the Regional Solicitor's Office for approval.

(4) The permittee agrees to take the responsibility for public safety and health during any phase of this event, including but not limited to those special conditions listed herein.

(5) The permittee will provide at least 100 course marshals to be placed at strategic locations in order to insure participant and spectator safety, resource protection, traffic and crowd control, and adherence to the marked course. Refer to the attached map and list of specific locations. (Attachment C)

(6) The permittee will provide a minimum of two course marshals at all public roads and railroad crossings to stop the race participants when crossing may be unsafe. At no time shall the course marshals allow the race to interfere with the normal flow of the public roadway traffic. Refer to the attached map and list for specific locations. (Attachment A & C)

(7) The entire course route will be clearly marked and flagged by the permittee under the supervision of the Bureau of Land Management. The course will be marked on an average of at least ten flags per mile. Additional or specialized course markings will be carried out in areas of the course so identified by the Bureau of Land Management. Refer to the attached map and list of specific locations. (Attachment A & C)

(8) It shall be the responsibility of the permittee to confine participating vehicles to the marked course and to limit spectator and support vehicles to the marked and identified areas. Refer to the attached map and list of specific locations. (Attachment A, C & D)

(9) Pick-up crews or support vehicles must enter the course route only from existing roads and must limit travel to the marked course or existing roads and trails. No cross-country travel by pick-up crews or support vehicles will be allowed.

(10) The permittee will be responsible for all trash and litter cleanup resultant from the event. The start, finish, and pit areas shall be cleaned up and the trash removed no later than eight days after the race. All course markers, signs, flagging, and discarded motorcycle parts located along the course shall also be removed no later than 15 days after the race.

(11) The permittee shall provide for a minimum of ten chemical toilets at the first pit stop, six chemical toilets at the second pit stop, six chemical toilets at the third pit stop, 22 chemical toilets at the start, and 16 chemical toilets at the finish area. This requirement must meet the applicable state and local standards and guidelines. (Attachment D)

(12) The permittee shall obtain the services of a fully equipped and trained desert first aid and rescue organization. This organization shall provide for, but not be limited to:

(a) All necessary first aid, retrieval, and evacuation for any injured person at any point along the entire course.

(b) Two-way radio communications.

(c) The coordination of the removal of disabled vehicles and riders from the course.

(13) The permittee will distribute written instructions subject to BLM review or will hold a prerace briefing at the site to inform participants of routes, regulations, safety procedures, and other necessary directives. The permittee assumes responsibility for riders and pit crew compliance to event instructions.

(14) The permittee shall contact the California Highway Patrol, Nevada Highway Patrol, San Bernardino County Sheriff, and Clark County Sheriff when the permit is issued.

(15) All motorcycles participating in the race will be equipped with proper brakes and muffler in good working condition. No vehicle equipped with muffler cutout, bypass, or similar device, or producing excessive noise, may be operated.

(16) The permittee shall make every effort to prevent, report, control, and suppress any fire in the operating area and will be held responsible for suppression and cost of fire caused on national resource lands through negligence of his participants.

(17) The permittee must submit a signed affidavit assuring that all private landowners whose property is affected by the event have been contacted and given their permission or consent of use.

(18) Any Government-owned structures, property, land, or resource harmed or damaged by the permittee, participants, or spectators associated with the permitted use shall be reconstructed, repaired, rehabilitated, and restored as may be required by BLM within 30 days after the event so that the condition thereof, in the judgement of BLM, is at least equal to the condition thereof immediately prior to such damage or destruction. Permittee further shall abate, as soon as possible, any condition existing which may cause harm or damage to any person, structure, property, land, wildlife, vegetation, and/or other resources.

(19) Race entrants will be limited to 3,000 riders.

(20) If the permittee does not attend the event himself, he will notify the District Manager of his substitute's name and planned headquarters for the event.

(21) The permittee will, within 14 days after the event, complete the attached Post Event Data form and submit it to the District Manager, Riverside District Office, Bureau of Land Management, 1414 University Avenue, Riverside, California 92507.

(22) The permittee must pay the United States a recreation use fee of five percent of gross receipts of the event (income from the operation of the event before deducting costs such as prizes, taxes, insurance, etc.; and to include income from participant and spectator fees, food and beverage concessions, etc.); or $1.00 per rider, whichever is greater. This recreation use fee will be prorated on the percent of the course traversing public land.

(23) If any affiliate not named on the SLUP application participates in sponsorship, management, or conduct of the event, the permit shall be null and void.

C. Site Specific Mitigation

The following list, the Supplemental Mitigation List, identifies specific locations within the area of the 1974 Barstow to Vegas Motorcycle Race and related activities, which because of potential environmental impacts will require special marking, flagging, course marshals, and/or protection. As part of the special conditions of the SLUP and under the supervision of the BLM, the permittee will be required to carry out these specific mitigation measures. An accompanying map shows the approximate location of each.

1. T. 11 N., R. 3 E., SBM, Sec. 24 and NE¼ Sec. 25 (start)

To avoid injury to riders and spectators, the start area will be clearly marked with lime and flagging; no less than six course marshals will be required to line up racers and to keep spectators off the course.

2. T. 11 N., R. 3 E., SBM, Secs. 25 and 36; T. 11 N., R. 4 E., SBM, Secs. 19, 20, 29-32 incl.; T. 10 N., R. 3 E., SBM, Secs. 1 and 12; T. 10 N., R. 4 E., SBM, Secs. 5 and 6 (camping at start area)

Camping areas will be designated and marked to avoid extensive impact to resources. At least four course marshals will be necessary.

3. T. 11 N., R. 4 E., SBM, S½ Sec. 16, SW¼ Sec. 17, S½ Sec. 20, and S½ Sec. 21 (ridge east of start area)

To avoid impact to the resources, the three dirt roads on the ridge will be blocked and posted as closed; at least one course marshal will be provided to keep joyriders off the ridge.

4. T. 11 N., R. 4 E., SBM, Sec. 17 (transmission line east of start)

To avoid the hazard of transmission line towers, to keep spectators off the course, and to moderate resource impact, special marking techniques will be worked out with the permittee. At least two course marshals will be required.

5. T. 11 N., R. 4 E., SBM, Secs. 6 and 7 (Spanish Canyon)

To avoid impact to resources, the canyon areas to the north of the start will be closed to vehicular traffic during the duration of the event.

6. T. 12 N., R. 5 E., SBM, W½E½ Sec. 28

To avoid impact to resources, the course segment will be routed ¼ mile north on existing graded road as designated by BLM personnel in the field.

7. T. 12 N., R. 5 E., SBM, SE¼SW¼ Sec. 14

To moderate impact to resources, the course must be channelled to narrow the route to 20 feet through approximately a 1,000-foot area as identified in the field by BLM.

8. T. 12 N., R. 5 E., SBM, SE¼SW¼SE¼ Sec. 14

To moderate impact to resources, the course must be channelled to narrow the route to 20 feet wide through approximately a 500-foot-long area as identified in the field by BLM.

9. T. 12 N., R. 6 E., SBM, SW¼SW¼ Sec. 8

To avoid impact to resources, the course route must be channelled to 20 feet wide through approximately a 500-foot-long area as identified in the field by BLM.

10. T. 12 N., R. 5 E., SBM, Secs. 13 and 14; T. 12 N., R. 6 E., SBM, Secs. 7-18 incl. (west of West Cronese Lake)

To avoid impact to resources, the course route must be marked to attempt to limit the course width to 100 feet.

11. T. 12 N., R. 5 E., SBM, SE¼ Sec. 12 (Cat Mountain)

To avoid impact to resources, the course will be flagged and marked to channel riders to and over the north saddle; at least two course marshals will be required.

12. T. 11 N., R. 7 E., SBM, Sec. 7 (Mojave River Wash)

To avoid course cutting and impact to resources, special care will be taken to mark and flag the course well. At least two course marshals will be necessary.

13. T. 12 N., R. 7 E., SBM, E½ Sec. 14; T. 12 N., R. 8 E., SBM, NW¼ Sec. 18 (Rasor Road Pit Stop)

The course in and out of the pit stop will be closely marked and flagged; pit crew and spectator areas will be identified and marked; at least four course marshals will be provided to keep spectators off the course.

14. T. 12 N., R. 8 E., SBM, Secs. 14 and 15 (SW Soda Lake)

To moderate impact to the resources, the permittee will be required to channel the course across the fan and through the mesquite dune as identified

in the field by BLM. Lath and flagging will be necessary. Immediately out of the mesquite dune, the course will be marked and flagged to keep the course on the existing road to Soda Playa (less than 1/8 mile). The crossing of the old Tonopah and Tidewater Railroad will be well marked and flagged, and crossing will be limited to only one location, 15 feet wide. The permittee will provide at least two course marshals for this location.

15. T. 12 N., R. 9 E., SBM, N½ Sec. 4 (Soda Lake Corral)

To avoid course-cutting, the permittee will provide at least two course marshals and special care will be taken to mark course well.

16. T. 13 N., R. 9 E., SBM, E½W½ Sec. 33 (E. Soda Lake)

To moderate impact to resources, course will be routed north via existing road and rejoined with proposed course where identified in the field by BLM.

17. T. 14 N., R. 9 E., SBM, Sec. 14 (Kelbaker Road Crossing)

To protect riders, the permittee will provide proper warning markers and two course marshals to function as flagmen.

18. T. 14 N., R. 9 E., SBM, N½ Sec. 11 (I-15 under-crossing)

To avoid course cutting, the permittee will take special care to flag and mark course well where it crosses under Interstate 15 and runs to the powerline road. At least two course marshals will be required.

19. T. 15 N., R. 10 E., SBM, S½ Sec. 2 Secs. 3-11 incl; Secs. 18 and 19, N½NW¼ Sec. 30; T. 15 N., R. 9 E., Secs. 13 and 24 (S. Turquoise Mountain)

To avoid and/or moderate impact to resources, the course will be clearly marked and flagged in areas identified in the field by BLM. Use of existing roads may be required.

20. T. 15 N., R. 10 E., SBM, S½ Sec. 2 (Halloran Spring Road Crossing)

To protect riders, the permittee will provide proper warning markers and two course marshals to function as flagmen.

21. T. 15 N., R. 10 E., SBM, E½ Sec. 2, NW¼NW¼ Sec. 1; T. 16 N., R. 10 E., SBM, SE¼SE¼ Sec. 35, Sec. 36 (Bull Spring Wash)

Route course along existing route as designated in the field by Bureau of Land Management.

22. T. 16 N., R. 11 E., SBM, SE¼ Sec. 33 (Pomona Mine Area)

To protect resources and to avoid course cutting, course will be flagged and marked well and one course marshal provided.

23. T. 16 N., R. 12 E., SBM, N½ Sec. 28 and S½ Sec. 21 (Valley Wells)

Pit area will be well marked and flagged. At least four course marshals will be provided.

24. T. 16 N., R. 12 E., SBM, N½ Sec. 21, W½W½ Sec. 16, NE¼ Sec. 17, E½ Sec. 8, W½ Sec. 4; T. 17 N., R. 12 E., SW¼ Sec. 33 (Kingston Wash)

Course will be confined to the Kingston Wash bottom and will be flagged and marked to indicate this requirement.

25. T. 16 N., R. 12 E., SBM, Secs. 7, 8, 17, 20, 21 and 28 (Kingston Wash North)

The course will be confined to the Kingston Wash bottom and will be flagged and marked to indicate this requirement.

26. T. 17 N., R. 12 E., SBM, N½N½ Sec. 8 (Excelsior Mine Road North)

To protect riders, the permittee will provide proper warning markers and two course marshals to function as flagmen.

27. T. 17½ N., R. 13 E., SBM, Sec. 19 (Mesquite Pass)

To avoid course cutting and impact to resources, the course will be closely marked and flagged. At least two course marshals will be required.

28. T. 17 N., R. 15 E., SBM, N½ Sec. 18 and S½ Sec. 7 (Stateline Pit Stop)

Pit area will be marked and flagged. At least four course marshals will be provided.

29. T. 27 S., R. 15 E., MDM, E½ Sec. 4 (Roach Lake Railroad Crossing)

Course will cross railroad right-of-way at existing crossing in section 4. Two course marshals will be provided to function as flagmen.

30. T. 26 S., R. 60 E., MDM, Sec. 9 (Sheep Mountain South)

To avoid course cutting and to reduce impact to resources, special care will be taken to mark and flag course well. A course marshal will be provided.

31. T. 25 S., R. 60 E., MDM, Sp Sec. 22 and Sec. 28 (S. Jean Lake)

Permittee will provide at least one course marshal and closely mark and flag the course.

32. T. 24 S., R. 60 E., MDM, Sec. 15 (Frontage Road Crossing)

The permittee will provide warning markers and two course marshals to function as flagmen.

33. T. 23 S., R. 60 E., MDM, Sec. 9 (County Road Crossing)

The permittee will provide warning markers and two course marshals to function as flagmen.

34. T. 22 S., R. 61 E., MDM, Sec. 19 (Finish)

The finish area will be marked and flagged. Spectator, pit, and camping areas will be designated. At least six course marshals will be provided.

The spectator parking access dirt routes will be watered an hour before and during the arrival of spectators and as necessary to keep the soil moist. Water will be applied at the rate of 2,000 gallons per acre or more as determined by the Bureau of Land Management to keep the area free of dust during the period of occupation by spectators.

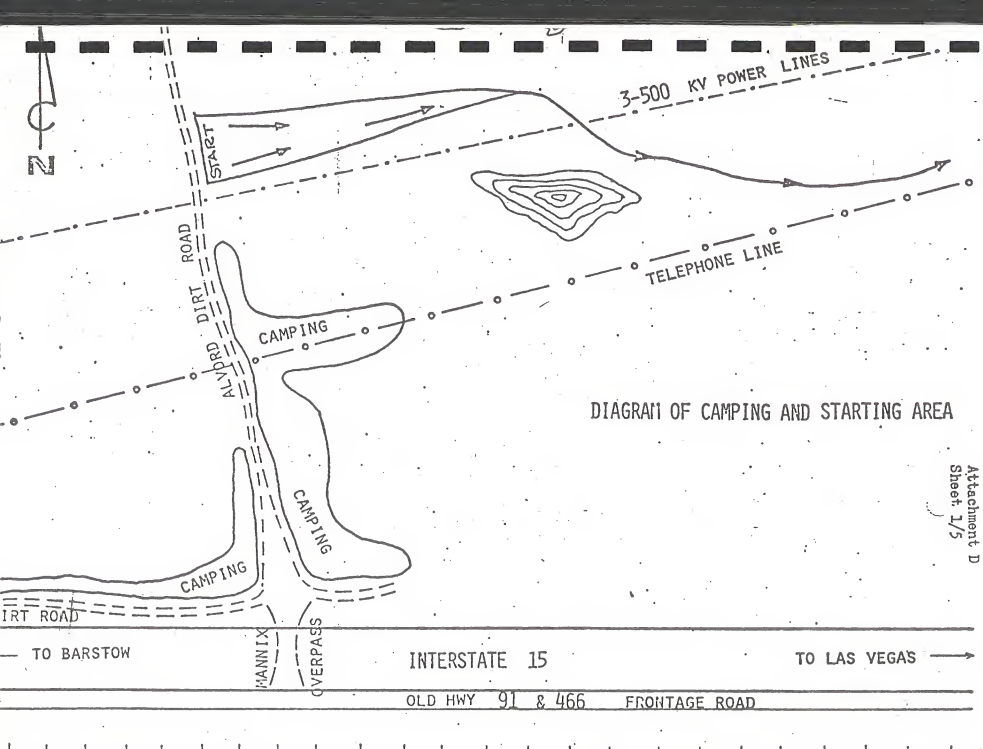


DIAGRAM OF CAMPING AND STARTING AREA

Attachment D
Sheet 1/5

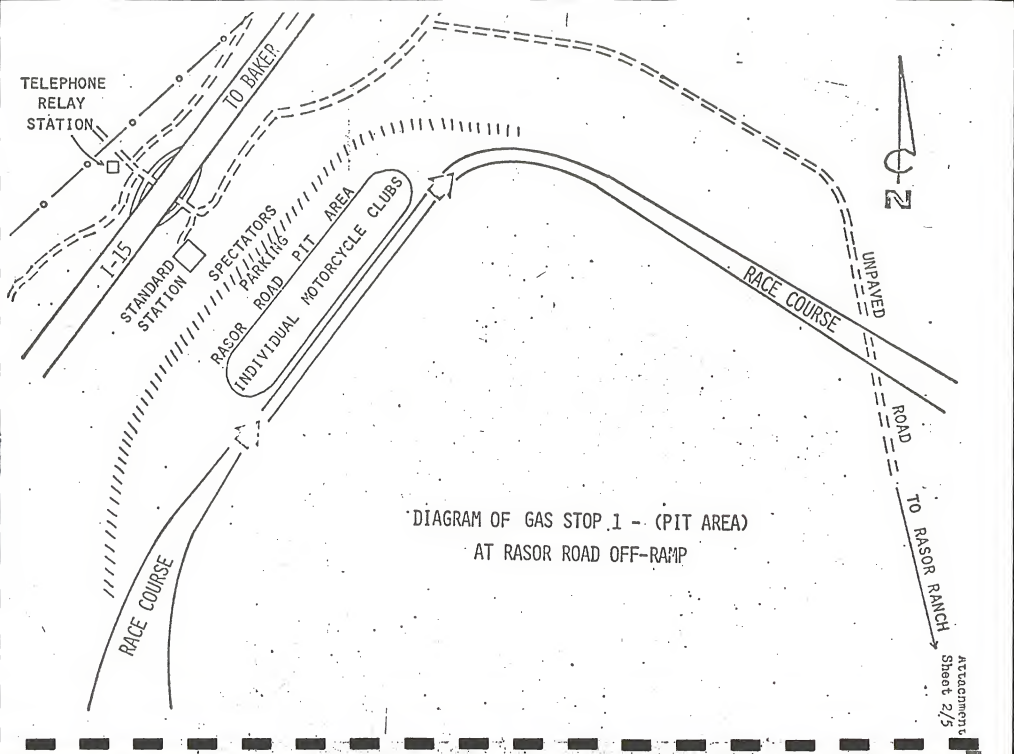


DIAGRAM OF GAS STOP 1 - (PIT AREA)
AT RASOR ROAD OFF-RAMP

Attachment
Sheet 2/5

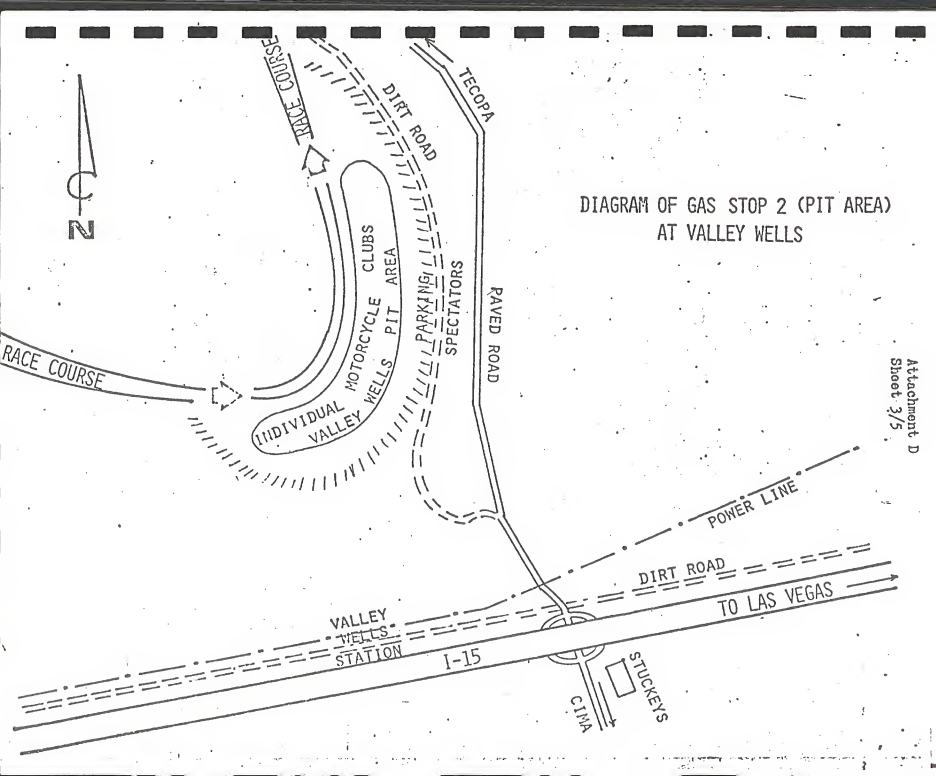


DIAGRAM OF GAS STOP 2 (PIT AREA)
AT VALLEY WELLS
N
RACE COURSE
DIRT ROAD
TECOPA
RACE COURSE
INDIVIDUAL MOTORCYCLE CLUBS
VALLEY WELLS PIT AREA
PARKING SPECTATORS
PAVED ROAD
POWER LINE
DIRT ROAD
TO LAS VEGAS
VALLEY WELLS STATION
I-15
CIMA
STUCKEYS
Attachment D
Sheet 3/5

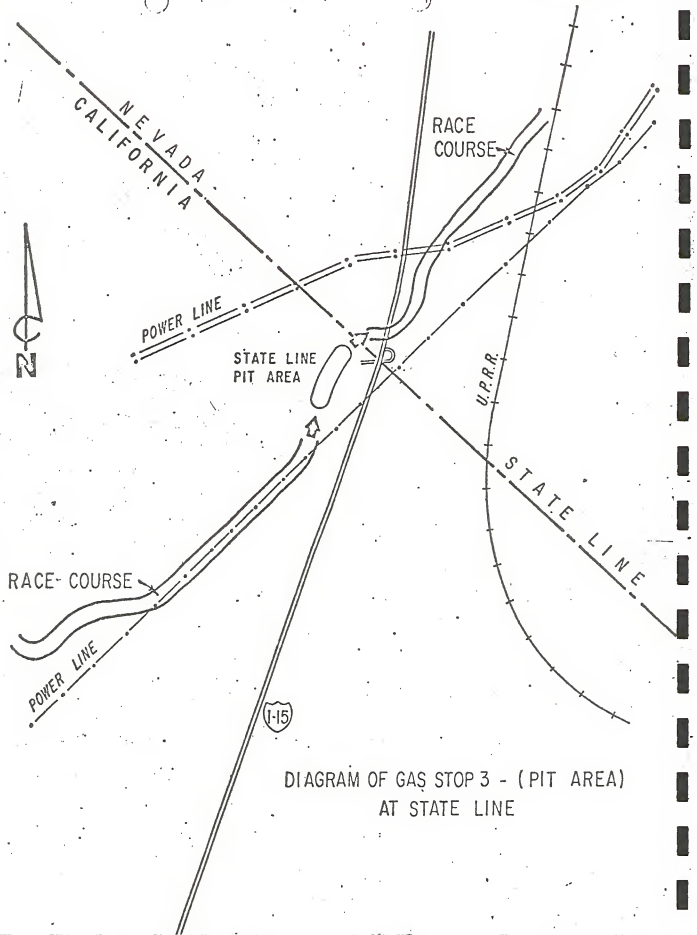


DIAGRAM OF GAS STOP 3 - (PIT AREA)
AT STATE LINE

BARSTOW TO LAS VEGAS RACE INJURIES

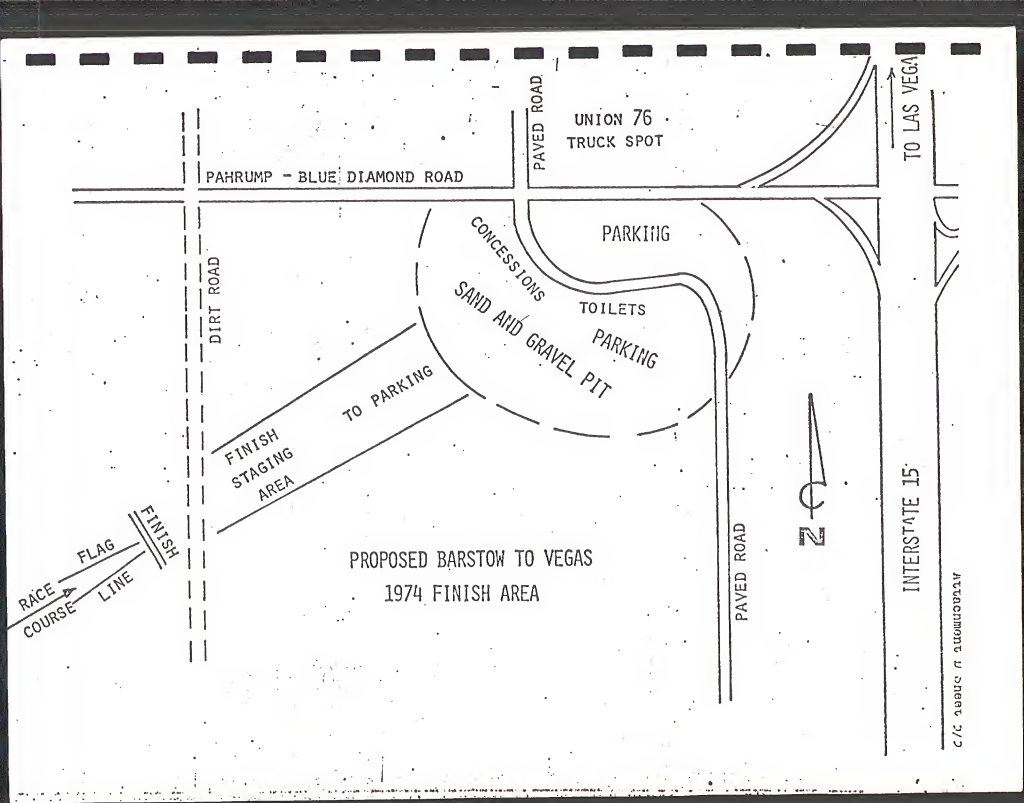
Ranger Brian Booher met with Larry Fecher, Commander of "Rescue #3" and Jeff Eastland, the Club's secretary on December 29, 1974, to discuss the injuries on the Barstow to Las Vegas Race.

Unfortunately, precise data regarding the location of each accident is not available. Generally, Commander Fecher, felt that the two areas with the most injuries were the Start and near Basin Road. He attributes the Start injuries to the nature of a mass start, and those at Basin Road to the trenches on East Cronese Dry Lake Bed and to his belief that the racers became more reckless at about that point, trying to get ahead.

Rescue #3 rendered first aid to 26 individuals during the race, 9 of which were transported to the hospital by ambulance. Six of the 9 had possible fractures, two had possible back injuries and one had a possible concussion. The remaining 17 had injuries ranging from objects in the eye to possible fractures.

A summary by suspected type of injury follows:

9	fractured foot or leg
3	fractured collar bone
3	fractured arm or hand
2	back injury
1	concussion
7	other minor injuries
1	unknown
Total 26	


PAHRUMP - BLUE DIAMOND ROAD
PAVED ROAD
UNION 76
TRUCK SPOT
TO LAS VEGAS
DIRT ROAD
PARKING
CONCESSIONS
TOILETS
SAND AND GRAVEL PIT
PARKING
TO PARKING
FINISH
STAGING
AREA
FINISH
FLAG
RACE
COURSE
LINE
PROPOSED BARSTOW TO VEGAS
1974 FINISH AREA
PAVED ROAD
INTERSTATE 15
N

Appendix #4

RECREATION USE SURVEY
BARSTOW-LAS VEGAS MOTORCYCLE RACE
November 30, 1974

Location _____ Hour _____ Observer _____

Vehicle

- Car
- Pickup
- Camper
- Motorhome
- 4-Wheel Drive
- Motorcycle
- Van
- Self Contained

Additional Equipment

- Dune Buggy
- 4-Wheel Drive
- Motorcycle
- ATV
- Trailer
- Other _____

Vehicle Occupant

Number of:
- Adults _____
- Children _____
- Males _____
- Females _____

Visitor's Occupation _____

Visitor's Origin (City/State) _____

Total Visits per year to Desert _____

Length of Stay 1 Night 2 Nights 3 Nights Other

Activities Engaged In

- Crew
- Spectator
- Participant
- Camping
- Fun ORVing
- Other

Since you have entered the desert area could you estimate how much you have spent on items such as gas, food, parts, beverages, etc., at local merchants $_____.

NOTES ON EACH OF 26 ENVIRONMENTAL SAMPLING PHOTO PLOTS

DESCRIBED IN THE EIS

ESP #1 - WEST OF START AREA

Plot #1 has only been slightly impacted; there are a few motorcycle tracks. However, most of these tracks are probably pit riding as it is behind the start. Soil samples were taken in these evidentally "one time" tracks.

ESP #2 - IN START AREA

Plot #2 is located up on a hill in a rather sandy soil and is somewhat uncommon of the start area.

An extra soil plot was taken 300 feet south of Plot 2. This area is more typical of the start area. The slope here is about 3%. The plot is about 100 feet south from the base edge of the sand hill. Although no "before" plot was taken, this area is visually identical to the soils in Plot #1. One creosote bush that was hit by a couple of bikes was collected to determine the productivity of this particular site. The height of the bush is 2½ feet. This bush was part of a very small ring (clone) whose diameter was 20 inches. The ring count averaged 29 rings per inch. Therefore, the origin of this bush was about 290 years old. This is a moderate growth site. Creosote bushes with 20 rings per inch can be found in more productive habitats in the Mojave Desert.

ESP #3 - SOUTHEAST OF START AREA

No other soil sample was taken as the course did not pass here. The two or three motorcycle tracks apparent in this area probably

are not associated with the race. Originally it was anticipated that the course would pass this plot after converging from the start. Actually, the course passed 300 feet north of the plot.

ESP #4 - CRUCIFIXION-THORN GROVE

The plot was relocated without difficulty, although the stake was not found immediately. The stake had been crusted over with a playa like soil. Some motorcycle tracks came right through the plot, rather than missing it, as planned. Vegetation in this area consists of very large creosote bushes, crucifixion thorns, some Mormon Tea, and some burro bushes.

The course here was approximately 560 feet wide instead of being kept to the existing road. Most of the racers, it appeared, stayed to the west of the plot and Crucifixion Thorn Grove. The soils to the left of the plot are rather sandy and rather deeply rutted in places - rutted to as much as a foot deep. Some Mormon Tea in the vicinity of the plot was heavily crushed; however, it looks as though the plants will probably resprout.

Just east of this plot and small little playa, the course was funneled by natural features, on the east by a hill with rocks jutting out and on the west by a rounded little hill and a road.

ESP #5 - WEST OF WEST CRONESE LAKE ON AN UP SLOPE

The plot is located on the south side of this course. It is located on a terrace covered with desert pavement. One or two of the tracks do show. However, most of the tracks were found on the north and east sides of the plot.

following the race. When heavy rainfall does occur, it may bypass the original channels in several places and make new courses following the motorcycle tracks. The motorcycle tracks in the majority have cut 6 inches deep. In addition, there are a number of dips which are about 2 feet deep. Several bushes about 2 feet tall and as broad, have been hit directly. Of these the stink weed and ephedra have been uprooted. This indicates an impact by several bikes, rather than a single crash.

ESP #13 - TURQUOISE MTN. ROAD CROSSING

The course here is about 155 feet wide; it is principally in six main tracks, each of which is about four to six feet wide.

Here, as elsewhere, there are no small seedlings in the tracks. There are numerous small seedlings under, and encircling for a short distance, each of the large clumps of bushes.

The creosote bush here is up to 10 feet tall. This height and presence of desert willow indicates a presence of underground water or runoff.

ESP #14 - BULL SPRINGS WASH ROAD

Here the riders apparently stayed on the road, which is about 19 feet wide. Impact here appears slight, perhaps because of these very well compacted surfaces.

There are no changes in slope past the plot. There appear to be no new dips in the road.

ESP #15 -

This plot appears to be the same as Plot 14. They stayed on the road.

ESP #16 - VALLEY WELLS PIT STOP

The course and pit area completely missed this plot. Soil pit was relocated here to the pit area as well as some general photos, but the formal ESP plot was not relocated.

ESP #17 - SHADOW VALLEY WASH

The total course width here was about 180 feet. However, it was mostly confined to the 4-to-10-foot wide deeper portions of the wash. A couple of individual tracks are visible from the ESP plot. A second soil sample is located about 100 feet west of the original soil sample, as the motorcycle riders missed the original plot.

ESP #18 - EAST OF SHADOW VALLEY ROAD CROSSING

The course here was confined to the bottom of a depression or wash which was about 8 feet across.

ESP #19 - KEANY PASS DIRT ROAD

The course here appears to remain entirely on the 19-foot wide road.

ESP #20 - STATE LINE PITS

It is very difficult to tell where the motorcycles came on the ground. It's also very difficult to tell where the pit crews were. It apparently rained quite heavily, as there were still puddles of water.

The surface has dried considerably and there are some tracks that have come since the race that are, no doubt, not associated with it.

From aerial oblique photos of the spectators it was determined the race course entered the dry lake surface over one mile earlier than anticipated and plotted on the EIS maps.

The course here averages about 360 feet wide. There are two large arrows with lime directing the riders toward a small saddle. The riders stayed toward the northern arrow for the most part. Coincidentally, the soil surface on the north side has fewer rocks.

Between Plot 4 and Plot 5, the course follows a wash and gently sloping bajada. On this slope numerous tracks are apparent, but when Plot 5 was originally located there was only one apparent road. In fact, in much of this area the course is confined to four or five narrow paths. This is apparently due to the fairly large number of 8 to 12 inch diameter sharp rocks throughout the area.

After a few motorcycle riders pass, the rocks get strewn aside and pave the way for later riders. The vegetation in this area was already sparse and consequently very little of it appears hit. The creosote bushes that were hit appear to be only damaged and may resprout.

ESP #6 - WEST OF WEST CRONESE LAKE ON A DOWN SLOPE

Plot number 6 was very easy to relocate as the post was located just east of a 12" high rock. Motorcycle tracks passed on either side of the rock; in fact, the rock was large enough to cause them to diverge. The course here begins downhill after riders have been confined by a rather narrow path. The course is widened after passing the top of the hill and beginning down. The increased visibility at the top encourages passing, thus cuasing a widening of the course.

The course is approximately 480 feet wide at this point. The use appears to be concentrated on approximately 15 trails. Here again, as in Plot 5, there are numerous six-to-twelve-inch diameter rocks, and also

rather large shrubs that would tend to concentrate the riders.

ESP #7 - WEST EDGE OF WEST CRONESE LAKE

Plot number 7 was located along a formerly used track. However, it was not used this time. The actual race course went to the south, about a quarter of a mile from this track. There are some tracks in this vicinity. However, it is unknown whether they were associated with the race.

Also, between Plot 6 and Plot 7, the churning of the soil was quite apparent and the rain that occurred after the race does not appear to have completely settled it.

ESP #8 - NORTH EDGE OF EAST CRONESE LAKE

The course here is as wide as 180 feet. However, most of the riders were apparently concentrated on a 15-foot wide course. Perhaps no more than 20 tracks occurred outside of this narrow band. Less than a quarter of a mile to the north, the riders have been concentrated to a trail less than 10 feet wide.

ESP #9 - EAST OF MOUTH OF AFTON CANYON

The racer here was confined to the dirt road which averages 24 feet wide.

ESP #10 - EAST OF RASOR PITS

Plot #10 is located just northeast of the road. The race appears to have run on the wouthwest side of the road and plot. It did not run east of the plot, as scheduled. Last year's course ran on the east side.

It is very difficult to surmise whether the visible tracks are part of the course or part of the pitting. The width of the course itself is difficult to calculate on the ground. A check with aerial photography of the pit area confirmed that pitting occurred this far along the course. Soil samples were taken along the track that was in the pit area.

ESP #11 - WEST SHORELINE OF SODA LAKE

This is an extremely sandy hummock. Numerous plants have sprouted about two weeks ago (12/1/74), probably after the first rain, which occurred before the first race. These seedlings have been destroyed, that is, completely eliminated on all of the motorcycle tracks.

A soil plot here was taken after the motorcycles have come down off the sand hummock and are on the sand flat. There are numerous tracks in the area. The width of the course right at the plot is about 130 feet. Immediately prior to the plot, the course is narrowed to about 70 feet by large, rather impenetrable thickets of mesquite.

After the plot, the course turns and widens considerably. Encelia plants were recorded when the plot was originally located. However, they were not discovered on the first remeasure. Near the south gate of Fort Soda Area, there are some very deep dips where, before the race, the road was smooth. Depth of the dips was estimated to about 3 feet. In addition, farther ahead on the course where it crosses the old railroad grade, this year's race has cut a trench through the grade about two to three feet deep. Three extra photos were taken in this area - one to show the dip, another to show the section of the road that appeared roughly as

it did before the race, and a third to show where the course passed over the railroad grade.

ESP #11A- EAST OF SODA LAKE

This plot occurs where the course leaves the Soda Lake Playa and begins to climb at about 10% on a sloping bajada.

The course here is 75 feet wide and it appears a bit sandy; however, it is crusting at the surface. There is no vegetation in the tracks themselves. There are numerous seedlings covering all of the soil away from the tracks. All seedlings were destroyed in the fresh motorcycle tracks.

In addition to the atriplex listed in the original plot record, there is also creosote bush in this area. Two to three hundred feet past the plot, the course widens to about 150 feet. It is still climbing at around 10% grade. There is evidence of a number of bushed being crushed. This widening occurs after they have passed the rocky hill that probably confines them at the plot. Rather than following 5 to 12 distinct tracks, the tracks essentially create a hundred foot or more wide swath across the desert. Dust probably caused riders to pass and widen the course.

The soil samples were taken in an area that appeared to have been on last year's race course as well.

ESP #12 - NARROW WASH

Here the course was confined to a width of 28 feet. Just prior to the plot - about a 100 feet - the course is widened by a few errant tracks to as much as 110 feet. Even though there are several 2-to-3-inch deep wash drainages crossing the course, no washing is apparent from the light rain

ESP #21 - ROACH LAKE

The course is about 25 feet wide here. It leaves Roach Lake where it was constricted to about 10 feet wide. Two hundred feet ahead of the plot the course widens to approximately 30 feet. The soil sample was taken about 100 feet east of the stake, in the middle of the course.

ESP #22 - WEST BASE OF BEER BOTTLE PASS

Here the course is extremely narrow, about 4 feet wide. However, there's evidence of a four-whell drive vehicle coming up behind the motorcycles, which has probably produced more damage to vegetation along the side than the motorcycles.

ESP #23 - EAST OF BEER BOTTLE PASS

The course 100 feet before the plot is approximately 9 feet wide. It splits and goes on 2 sides of the plot where they are 6 feet wide each. The "whoop-dee-doos" (alternating ridges and depressions caused by the motorcycles) are approximately 2 feet deep. They extend several miles until about one-half mile from Jean Lake.

ESP #24 - JEAN LAKE

The total width of the course here is about 90 feet. However, the biggest concentration of tracks occurs around 25 feet wide. Numerous plants appear to have been crushed during the race. Most of these plants are Russian thistle.

ESP #25 - WEST OF FINISH

The course here appears to be about 120 feet. Although it has rained here, the most recent tracks appear to be lighter color and less consolidated on the surface. There is no young seedling growth here,

either on the course or off. This was also true of the Jean Lake and East Beer Bottle Pass Plots. The creosote bush in the area are seldom over 18 inches tall. It is generally a bleak-looking site. The power tower was inadvertantly omitted from the first photo series.

ESP #26 -

The soil churning and vegetation removal here was so drastic as to require over one-half hour to relocate the ESP Plot Center Post.

TSD-TR-75-1

DUSTFALL STUDY OF THE 1974 STUDY MOTORCYCLE RACE, BARSTOW TO LAS VEGAS

Mark L. Villalobos,
Technical Services Division

February 22, 1975

SAN BERNARDINO COUNTY
AIR POLLUTION CONTROL DISTRICT
172 W. 3RD STREET
SAN BERNARDINO, CALIFORNIA 92401

FORWARD

This Technical Report was prepared by the San Bernardino Air Pollution Control District. The report describes the Experimental Plan, Equipment and Data collected in the monitoring of the Barstow - Las Vegas Motorcycle Race on 30 November 1974. The work was performed between 25 November 1974 and 31 January 1975.

APPROVED:

DONALD M. THOMAS
Air Pollution Control Officer
San Bernardino County
Air Pollution Control District
172 W. 3rd Street
San Bernardino, California 92401

Date: _____

ACKNOWLEDGEMENTS

The author wishes to acknowledge the considerable efforts of other members of the San Bernardino County Air Pollution Control District staff that were involved in the photography, planning and gathering of data and critique of this dust study report.

APCD STAFF

Dr. Hugh E. Malone, Chief Technical Services Supervisor

Roy L. Pitts, Instrument Technician

Timothy D. Porter, Student Aide

Thomas O. Pousey, Student Aide

Robert J. Sipchen, Instrument Technician

Dr. H. Kendall Wilcox, Chemist II

The federal personnel on duty, the day of the race, from the Bureau of Land Management were also most helpful and deserving of recognition.

TABLE OF CONTENTS

LIST OF TABLES

MOTORCYCLE RACE BARSTOW TO LAS VEGAS DUSTFALL STUDY

I. OBJECTIVE:

To monitor the dustfall particulates and carbon monoxide produced by the Barstow to Las Vegas motorcycle race on November 30, 1974 and to assess the impact of dustfall on the desert community.

II. BACKGROUND

The San Gabriel Valley Motorcycle Club has conducted an annual cross-county race each year for the past eight years. The race, with 3,000 participants, begins about 25 miles NE of Barstow and crosses Highway 15 four times before terminating after 168 miles, approximately five miles South of Las Vegas. Three pitstops, located approximately 40 miles apart, afford maintenance, for the race participants. An Environmental Impact study dated October 1974, was prepared by the Bureau of Land Management (BLM). The San Bernardino County APCD's contribution to this Impact Study recommended that the race should be disallowed. The APCD position was in agreement with the authors of the BLM Environmental Impact Report. In spite of these recommendations, permission to hold the race was granted. The APCD Technical Services Division was alerted on Nov. 21, 1974 that monitoring support for the race might be required. Mr. Gilliksen (BLM) called on Nov. 22, 1974, and was referred to Mr. C. A. O'Malley, (Ass't APCO) and in turn, the Board of Supervisors, for approval in providing support for the race. The Board of Supervisors approved monitoring support for the race by APCD personnel on Nov. 25, 1974.

On December 30, 1974, DONALD M. THOMAS (Air Pollution Control Officer) communicated to the Board of Supervisors the status of the APCD imput on the Barstow to Las Vegas Motorcycle race. (Interim Progress Report on Data Analysis from Motorcycle Race - Barstow to Las Vegas). It recommended that a final report was to follow after all the data had been collected and analyzed.

Fifteen sampling sites were selected at the start of the program. Ten sampling sites were selected to measure the dustfall from motorcycles and other vehicles involved in the race. Five sample sites were located to exclude the effects of motorcycles and off road vehicles of this particular race. Of the

15 sampling sites only nine of the former and two of the latter survived the duration of the program. Four sampling sites were vandalized; however, enough samples were available to give some degree of representation to the areas of interest.

III. EXPERIMENTAL:

A preliminary survey of the race course was conducted to stategically locate the best sampling points that would reflect the various degrees of dustfall particulates that result from Motorcycles and off road vehicles associated with the race. The following points were considered:

1. Location of electric power.
2. The proximity to the race course and pit stop area.
3. The location in relationship to human activity; homes, camp ground, roads, etc.
4. Access to main roads for easy maintenance of stations.
5. The influence of the topography and prevailing wind conditions.

A. SAMPLING PLAN:

Ten experimental sample points were selected for dustfall dustjars. Five background sample points were selected to gather background data that was not affected by the Motorcycles or other off road vehicles from the particular race or activities on 30 November 1974. The ten experimental locations are as follows:

SITE NO. SAMPLING SITES ALONG RACE COURSE

1. In contestant's campground about one mile north of highway 15 and about 200 yards west of Alvord Road. (Campground)

2. About 100 yards west and behind at the end of start line to the west of Alvord Road. (Start line)

3. About one half mile east of start line on third high voltage tower no. 110. 2. (Tower #3)

4. About 2 miles east of start line and the 12th tower number 128. 5. (Tower #12)

5. On the southwestern buttress of the overpass on Wash where the Motorcycle course crosses highway 15, near Basin Road. (S. W. Basin Rd.)

6. About 100 yards from Basin Road on opposite bank of Wash from #5. (N. E. Basin Rd)

7. On top of shed roof by Chevron Gas Station on Rasor Road near Pit Stop. (Rasor Rd.)

8. At Valley Wells Pit Stop about two miles west of Cima Road at base of hill near pit stop area camp. (Valley Wells Pit)

9. At Valley Wells Ranch about 2 miles north of Highway 15 parallel to Motorcycle Course. (Valley Wells Course)

10. At Valley Wells Ranch about 1/2 mile north of Highway 15, inside ranch property near bybungalow. (Valley Wells Ranch)

BACKGROUND SITES NOT AFFECTED BY THE RACE

11. About 100 yards east of Alvord Rd. near Alvord mountain mine. (Alvord Mine)

12. About one mile south of Yermo Road and two miles west of Fieldroad. (Field Rd.)

13. About 1/2 mile from campground nearby dirt roads and old motorcycle trails in Afton Canyon. (Afton Canyon)

14. About three miles from Highway 15 turn-off in Mountain Pass Area south of Highway 15. (Mt. Pass)

Background samples site were selected to evaluate our controls. Sample site #12 Field Rd reflected the virgin state and sampling site #13 Afton Canyon, reflected the denuded state. Sample site #12 was located in a relatively flat area. There were no obvious signs of off-road vehicles. The creosote bush displayed even growth and the ground was covered with a deep layer of fine gravel. A ratio between the virgin site dustfall and each control site dustfall was compared.

Sample site #13 in Afton Canyon reflected the adverse conditions. It was located by a dirt road in an area that had been denuded by off-road vehicles. The immediate area had larger vegetation and was more humid. However, it was surrounded by hills that were crisscrossed by a high degree of off-road past activity and some non-paved traffic in present use.

* Preliminary results were obtained from the experimental group by gravimetric analysis of:

(1) Dustfall jars
(2) A. I. S. I.
(3) High Volume Sampler filter of suspended particulates
(4) Grab samples for carbon monoxide
(5) Weather observations by an MRI instrument

The experimental period consisted of a brief exposure of dustjars before the race during the race, and a brief exposure after the race. This varied from 3. 5 - 22. 0 hours. The control group period consisted of the continued exposure of dustfall jars after race and after the experimental dustfall jars had been gathered. This period varied from 3-6 weeks, for dustfall jars only.

*(1) Dustjar - Plastic jar with 6. 5 in. mouth opening and 3. 5 liters capacity filled to adequate level with . 1% formaldehyde and distilled water, measures Tons/sq. mile/30 days

(2) AISI - American Iron and Steel Institute type spot evaluator manufactured by Research Appliance Co. , Allison Park, PA. measures coefficient of haze.

(3) High Volume Air Sampler - 8" x 10" glass fiber filter type "A" 24 hrs. suspended particulates measured in ug/m^3.

(4) Drager type colorimetric indicator tubes sensitive to carbon monoxide 2-4 parts per million.

(5) MRI - Meteorological Research Institute - Portable weather station and recorder of wind direction, average wind speed, and air temperature measurements.

B. LOGISTICS:

The evaluation of the pollutants from 3000 motorcycles along a 180 mile course in a remote area dictated the use of the following test equipment:

1. Thirty standard dustfall jars.
2. Fourteen dustjar stands and holders.
3. Three High Volume shelters.
4. Three High-Volume filters with timers
5. Three A. I. S. I. tape samplers.
6. Two AC 110 volt generators.
7. One Bendix hand squeeze-pump kit.
8. 10 Carbon Monoxide Draeger tubes (colorimetric indicators)
9. One, four wheel drive off-road vehicle and one standard pick up truck.

IV. DISCUSSION:

The sampling site locations and the sampling equipment located at these sites are shown in Table.I.

TABLE I

EQUIPMENT AND SAMPLING SITE PLAN

SAMPLE NO.	LOCATION	DUSTFALL JAR	HI-VOLUME FILTER	A. I. S. I.	CO TUBE	MRI WIND
1	Campground	X			X	
2	Start line	X			X	
3	Tower #3	X	X	X		
4	Tower #12	X				X
5	S. W. Basin Rd.	X				
6	N. E. Basin Rd.	X				
7	Rasor Rd.	X	X	X	X	
	Valley Wells Pit	X				
9	Valley Wells Course	X				
10	Valley Wells Ranch	X	X	X		
11	Alvord Mine	X				
12	Field Rd.	X				
13	Afton Canyon	X				
14	Mt. Pass	X				

Table II represents the results of the experimental samples, dustfall tons/sq. mile/ 30 days. It also shows the variable exposure time and concentration in tons/sq. mile/ hour. Data from the 1966-1968 San Bernardino County APCD Annual Reports shows Barstow to have a maximum of .229-.270 tons per square mile per hour.

TABLE II

EXPERIMENTAL DUSTFALL

SAMPLE SITE NO.	DESCRIPTION	EXPOSURE HOURS	TONS/SQ MILE/ HOUR	TONS/SQ MIL 30 DAYS
1	Campground	20.0	7.5	5,400
2	Start line	3.5	5.4	3,888
3	Tower #3	3.5	24.3	17,496
4	Tower #12	21.0	6.2	4,464
5	SW Basin Rd.	3.5	15.6	11,232
6	NE Basin Rd.	7.0	7.0	5,040
7	Rasor Rd	4.5	4.2	3,024
8	Valley Wells Pit	6.0	1.4	1,008
9	Valley Wells Course	6.0	3.3	2,376
10	Valley Wells Ranch	22.0	1.6	1,152

Calculation: example $\frac{\text{Dust collected during experiment}}{\text{experiment exposure hours.}}$ *(f)(24)(30) = Tons/sq mile/30

The maximum normal dustfall encountered in the Barstow area is 165-195 tons per square mile per month. *(f) = factor for conversion of grams to tons for 6.5" wide mouth jar.

A. I. S. I. DATA

AISI tape samplers were set to obtain a sequential sample every two hours with a three minute lapse time. The instruments operated for a brief period before the race during the race and brief period after the race.

Table III showed the average peak dust concentration to be from 3-5 times greater during the time of the race.

HIGH VOLUME SAMPLER

Table IV shows the suspended dust during the race and one day afterwards for two stations. We failed to obtain a satisfactory sample at site No. 3. The Rasor Road site showed no change.

TABLE III

A. I. S. I. TAPE SAMPLE

SAMPLE SITE NO.	DESCRIPTION OF LOCATION	AVERAGE (COEFFICIENT OF HAZE) (COH)	PEAK COH	30 NOV 1975
3	Tower #3	. 25	1. 2	between 0700 hrs. 0900 hrs.
7.	Rasor Rd	. 20	. 50	between 1100 hrs. 1200 hrs.
10.	Valley Wells Ranch	. 25	. 70	between 1506 hrs. 1712 hrs.

(Coefficient of Haze) 1 COH Unit = That quantity of particulate matter (e. g. dust) which produces an optical density of . 01 on filter paper.

TABLE IV

24 HR. HIGH VOLUME SUSPENDED PARTICULATES

SAMPLE SITE NO.	DESCRIPTION OF LOCATION	ug/m^3 DURING RACE	ug/m^3 AFTER RACE 1 DAY LATER
3	Tower #3	No Sample	No Sample
7	Rasor Rd	176	180
10	Valley Wells Ranch	158	94

State standard not to exceed 100 ug/m^3

The geometric mean for Barstow for 1975, and 1974 was 74 and 104 ug/m^3.

Grab samples for carbon monoxide were taken where there was evidence of dense vehicle traffic. Draeger type tubes with special colorimetric indicators sensitive to 2-4 ppm carbon monoxide were used.

Tests were conducted during the start of the race and performed over a time span of 12 minutes around the immediate periphery of the starting area and the road bisecting the camp area. Similar tests were taken at the Rasor Road Pit Stop area about 12:00 hours, a period of peak activity. The average readings were less than 12 ppm CO. Thus, the State ambient air quality standard for CO of 40 ppm for one hour, were not exceeded.

Table V, VI, and VII present the control data (affected by the race) and background data (unaffected by the race). Table V shows the control group exposure for 120, 384 and 480 hours after the race and the total dustfall in tons/sq mile for 30 days. The data shows a wide range of dustfall concentration for the various sampling sites.

Sampling sites #2, #6 and #7 are approaching the same as the background levels shown in Table VII for the background Sampling Site #12. Sampling Sites #1, #3, and #4 are from 4 to 6 times greater than the background levels. Sampling Sites #9 and #10 are from 18 to 30 times greater than the background levels. Sampling Sites #9 and #10 were located in inhabited areas, with unpaved roads, where livestock browsed and were essentially free of vegetation.

Table VI presents a summary of the experimental, control and background dustfall data. The column marked "combination" was obtained by using the equation at the bottom of Table VI and represents the total dustfall tons per square mile for 30 days during and after the race.

The column marked "Impact of Race" represents the percent increase per month of dustfall. For Sampling Sites #9 and #10 the race had little or no effect on increasing the dustfall per month while for Sampling Site #4 the race increased the dustfall by 48%.

The Index of Background is the numerical data for Table VII. This data was compiled by obtaining a ratio of the background dustfall data of 41. 8 tons/sq. mile/30 days (Sampling Site #12) to the data from each of the ten control Sampling Sites. For example:

$$\frac{\text{Control}}{\text{Background}} = R \; ; \quad \text{Index} = R - 1$$

$$\frac{185}{41.8} = 4.4 \; ; \quad 4.4 - 1 = 3.4$$

Table VII presents a graphical representation of the increase of dustfall concentration above the background for each of the ten Sampling Sites.

TABLE V

CONTROL GROUP DUSTFALL

MPLE	DESCRIPTION LOCATION	EXPOSURE DEC 4 HRS.	EXPOSURE DEC 20 HRS.	EXPOSURE JAN 9 HRS.	TOTAL EXPOSURE HRS.	DUSTFALL TONS/SQ. MILE 30 DAYS
	Campground	119.8	384	480	984	185.0
	Start line	---- N.S.	----	480	480	50.4
	Tower #3	119.6	384	----	504	306.7
	Tower #12	120.0	384	----	504	180.0
	SW Basin Rd	120.0	----	----	120	306.7
	NE Basin Rd	120.0	384	480	984	61.9
	Rasor Road	120.0	384	480	984	46.1
	Valley Wells Pit	----	----	----	Destroyed No Sample	
	Valley Wells Course	120.0	384	480	984	814.0
)	Valley Wells Ranch	120.0	384	480	984	1,334.1

BACKGROUND GROUP DUSTFALL

Alvord Mine	----	----	----	Destroyed No Sample	
Field Rd	----	384	480	864	41.8
Afton Canyon	----	384	480	864	501.1
Mt. Pass	----	----	----	Destroyed No Sample	

Calculations: example Dustfall

= Total dust collected grams (f) (24 x 30) = tons/sq. mile/30 days
Total exposure hrs.

TABLE VI

SUMMARY OF DUSTFALL DATA

SAMPLE NO.	LOCATION	DUSTFALL TONS/SQ. MILE/30DAYS Brief exposure during race "A" (EXPERIMENTAL)	DUSTFALL TONS/SQ. MILE/30DAYS After race only 3-5 weeks "B" (CONTROL)	DUSTFALL TONS/SQ. MILE/30DAYS combination during & after race 3-6 wks.	IMPACT OF RACE % increase per month	INDEX OF BACKGROUND
1	Campground	5,400	185.0	225.4	19%	3.4
2	Start line	3,888	50.4	79.9	36%	.2
3	#3 Tower	17,496	306.7	425.5	27%	6.3
4	#12 Tower	4,464	180.0	347.8	48%	3.3
*5	SW Basin Rd	11,232	306.5	688.3	55%	6.3
6	NE Basin Rd	5,040	61.9	97.9	36%	.4
7	Rasor Road	3,024	46.1	59.8	22%	1
8	Valley Wells Pit	1,008	No Sample	N/S	N/S	N/S
* 9	Valley Wells Course	2,376	814.0	836.0	3%	18.4
* 10	Valley Wells Ranch	1,152	1,334	1461.0	9%	30.8
11	Alvord Mine	-----	No Sample	-----	N/S	N/S
12	Field Road	-----	41.8	-----	N/A	0.0 Contrc
13	Afton Canyon	-----	501.1	-----	N/A	10.9
14	Mt. Pass	-----	No Sample	-----	N/S	N/S

Calculations example: of Combination Dust-fall during & after Race = $\frac{\text{Total dust collected in "A" \& "B"}}{\text{Total exposure hrs. from Table II \& V}}$ (f) (24)(30) = tons/sq. mile/30 days

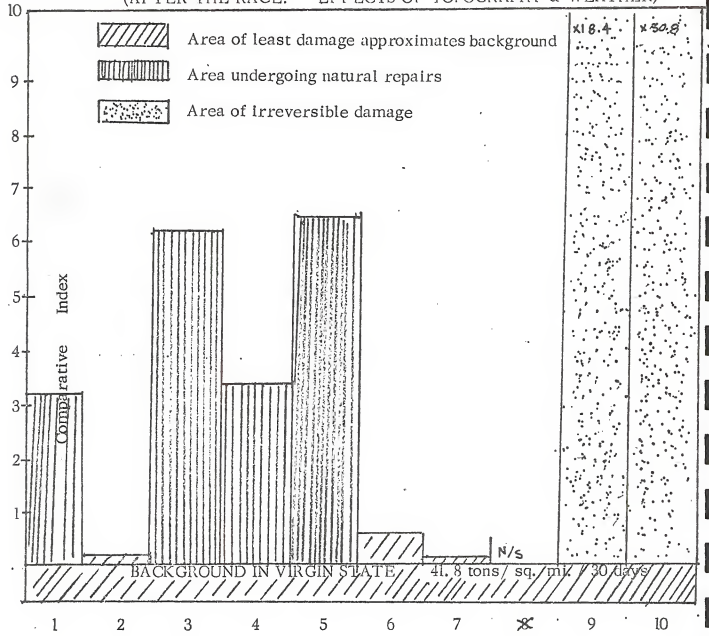
*NOT INCLUDED IN AVERAGE

Total effect of Race on Dustfall concentration for one month (30 days) was 30% above normal background.

TABLE VII

COMPARISON OF VIRGIN BACKGROUND TO CONTROL GROUP

(AFTER THE RACE: EFFECTS OF TOPOGRAPHY & WEATHER)



SAMPLE STATION NUMBER LOCATION

Historical data taken from 1966 - 1968 San Bernardino County APCD Annual Reports indicate that the maximum dustfall normally encountered in the Barstow station is 165-195 tons per square mile per month. (2.9 - 3.6 on Index)

IV. DISCUSSION (CONTINUE)

The amount of dustfall contributed by 3000 motorcycles and probably 2000 vehicles such as dune buggys, campers, trucks, automobiles and numerous campfires was very high. Within three to four hours the concentration of dust was six to ninety times higher than the norm for the area. The peak concentration of dust could be one thousand times higher during the first fifteen minutes of the race when a crescendo of dust was reached. However, the sampling devices could not substantiate this. The meteorological measurements indicate that the race was favored by weather conditions - During the race (0700-1000 hr) the wind didn't exceed three miles per hour; The predominant wind direction was from the east. Favorable weather conditions allowed the dust to settle quickly. The Dustjars cannot substantiate the amount of suspended particulates (minus 30 micron particle). However some unknown degree of suspended particulates are created as a result of man-made activity. The monitor high volume air samples at the Barstow station for suspended particulate did not indicate any increase in suspended particulates. In fact Barstow still remains as one of few station In San Bernardino County that does not exceed the state standard of 100 ug/m^3.

The location of the dust-jars are more important than exposure time when relating to a short term effect. For example station #4 (four) collected much more dust than station #3 (three) because the former was located where the contestants converged under the high tension power line part of course. However, inorder to express results in concentration it is necessary to normalize exposure time (station #3 exposure 3. 5 hours vs. station #4 21 hours). Since concentration is an inverse function of time, a very brief exposure will cause a greater bias to the control. Therefore sample No. 5 (SW buttress on bridge on Highway 15 and Basin Road Wash) of the control group will be excluded, it had only 120 hours exposure.

The total combined dustfall, tons/sq. mile/30 days during and after the race, was obtained by combining all the analytical weights of the experimental sample and control then dividing by the total exposure. All results were expressed on a 30 day basis. The average percentage increase of the affected stations (1-7) was 31% Station 9-10 at Valley Wells were affected only by 3 and 9%. By comparison the Motorcycle race made an impact on the first stations and no considerable impact to the Valley Wells area. The topography, degree of denudation, the lack of paved roads, live stock raising, the activity of other vehicles, and high winds tend to elevate the normal dust fall more than the motorcycle race.

VI. SUMMARY

1. Ten Sampling Sites were selected along the race course and a set of two dustjars were placed back to back at each site.

2. From each set, one was used to obtain the dust during the race which was as high as 17,496 and as low as 1,008 tons/sq. mile / 30 days.

3. From each set, the other dustjar was used to obtain dust for about 30 days which was as high as 1,334 and as low as 46.1 tons/sq. mile/ 30 days.

4. The impact of the Barstow - Las Vegas Race to the normal dustfall of the affected area is about 30% for one month.

5. The Valley Wells Community (inhabited area) reflects the worst dustfall conditions, which cannot be attributed to the Motorcycle race exclusively. The impact due to the race is less that 10% in this area.

6. The tower #12 Sampling Site (uninhabited area) reflects the worst effects from motorcycles all converging on a small area (48%).

7. Conditions after the Race - Some areas approximate the monthly dustfall concentration of the natural background; others reflect that they are undergoing natural repairs. The Valley Wells area reflects irreversible soil damage that existed before the race.

8. Suspended particulates (Particles less than 30 microms). The high volume air dust sample was 1.5 times greater during the race than one day after the race at Valley Wells. There was no significant change in suspended particulate at the Rasor Rd. Site.

9. All carbon monoxide emissions were below the state standard.